

LOCATION OF INDUSTRIES IN INDIA

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LOCATION OF INDUSTRIES IN INDIA

BY

TULSI RAM SHARMA

M. A. (Econ.), M. A. (Com.), Ph. D.
Head of the Commerce Dept.
B. R. College, Agra

FOREWORD BY

DR RADHAKAMAL MUKERJEE

*SECOND EDITION
Revised and Enlarged*



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FOREWORD

It is a pleasure and pride to honour the request of Dr T. R. Sharma to contribute a Foreword to this original and systematic work on the location, planning and redistribution of industries in India—a research project for the doctorate undertaken and completed under my supervision at the University of Lucknow. Most advanced countries in the world established their industries in the nineteenth century, haphazardly with slight reference to the patterns of resource and transport or to the social implications of industrialism. In countries intersected by artificial political boundaries and dominated by notions of nationalism and empire the rapid tempo of industrial development and mass production has been the root cause of industrial offensives, conflicts and wars. In Europe the boundaries of states cross natural industrial regions forcing upon them arbitrary industrial locations and economic policies that have brought them into conflict with one another. The Smithian principle of international division of labour took account principally of the natural resources, capital and markets of the leading industrial nations of the world and a regime of free trade and enterprise in an expansive world economy. Its world-wide application was responsible for monoculture, soil exhaustion and proletarianization of the raw-material countries and insecure and lopsided economic development of the advanced industrial countries with their chronic problems of unemployment and slum-life and social deterioration.

The orthodox theory of freedom of enterprise and *laissez-faire* and global division of labour is now superseded by Weber's theory of industrial location as the basis of economic planning. Professor Sharma has, with much insight and objectivity, used this theory in discussing the present uneven distribution of industries in India and their planned location. One by one he has taken the major industries of the country and with a vast wealth of statistics and carefully drawn maps argued for their regionalization and proper redistribution in the economic plan of the future. The conditions of future orientation and development of textile industries, iron and steel, sugar, and leather are all carefully analysed, the limitation of their present distribution indicated

and the opportunities for a long-term planning and co-ordination on an all-India basis clearly set forth. Perhaps the cotton and sugar industries are the worst instances in India of misplanned, pell-mell development which has got to be corrected in the very near future in the interests of national efficiency. There will be and bound to be resistance on the part of vested interests but independent India will have to visualize a national economic plan in the comprehensive long-term interests of the people. In the future national economic planning the pattern of transport, formerly developed with a view largely towards foreign trade and short-term interest of foreign investors, will have to be re-oriented to the development of industries in the interior of the country, while canalization and inland navigation, so long neglected, will aid regionalization and decentralization of industries.

There is no doubt that in a predominantly agricultural economy as that of India even under the regime of planned industrialization widely dispersed agricultural industries processing the raw materials of the fields will play a much larger role as in the small agricultural countries in Europe, than is at present realized. It must be remembered that about 85 per cent of the workers engaged in industrial occupations are now employed in small and cottage industries. This percentage will hardly be altered in spite of our coming industrial expansion. On the other hand the great industrial problem will be to introduce labour saving machinery and implements into small-scale and cottage industries and organize them into industrial co-operatives. The success of the Chinese Indusco should be an eye-opener for the industrial planner in India.

The possibilities of rural industrialization in India have greatly increased in recent years due to the development of certain multi-purpose regional projects for expanding irrigation, power development and navigation in the major river basins. The T. V. A. schemes hold indeed the key for planning and development in large parts of India. Some indeed are already on the way. In association with these regional electric grids comprising both hydel and thermal plants and power as well as irrigation-cum-power objectives will cover by their network the whole of India. Thus electricity will be the saviour of agriculture which is sub-marginal occupation of the considerable proportion of Indian workers and of rural industries so unhappily and helplessly facing their doom in the present epoch of unplanned

industrialism. In planned industrialization, however, the scope of industries in rural areas will be much expanded and diversified and there will be a flexible adaptation and integration of these to the structure of large-scale industries so that the latter will aid and not weed out the former. It is only this reorganization of relations between the big and small establishments in the industrial structure that can restore the balance between agriculture and industry in the country and bridge the yawning gulf between rural backwardness and lopsided, parasitical, urban growth. The interpenetration between agriculture and industry and between large- and small-scale industry provides promise of the quickest increase of national income and the adaptation of industrial development to the social pattern of an agricultural civilization.

These are wider issues of industrial planning in an agricultural country like ours where 'rurbanisation' or 'agro-industry' is indeed the principal means of correcting the present uneven distribution of population, industry and wealth and the disorder in technology that now spells social chaos and economic depression for the rural areas. But the more immediate issue of industrial planning is the development of a strong Central authority that will control, redistribute and co-ordinate industries. In the coming Indian constitution that is now being shaped there is the greatest danger that the Centre would be too weak for industrial planning. A weak and loose federation cannot lead India towards her industrial advance without which the present burden of poverty and rural depression cannot be lifted. This is the most significant lesson of Professor Sharma's important work that must be seriously considered by economists and politicians alike in the country's present political transition. If India becomes a first class industrial power in Asia the core of this development will be represented by the mineral region covering parts of Bengal, Bihar and the C. P. in which the heavy engineering, mechanic, machine-tool and chemical industries will be located. But this would introduce planned control and co-ordination of the basic industries by a strong Centre. The autonomy of the different provinces and the states should not be incompatible with large-scale planning from the Centre on the basis of regional groupings that overstep present artificial boundaries.

Regional planning in the major river basins and industrial areas of India should form the basis of all-India planning and the

work of inter-regional and inter-provincial economic councils should be dovetailed into Central economic administration. Indian statesmen of the future must fully acquaint themselves with the geographical natural regions if they are to build for both political stability and industrial power and progress. Political freedom in the absence of industrial power will make India the magnet of foreign invasions and infiltrations. But freedom utilized for economic planning and increase of industrial power will make India the strongest bastion of peace in Asia.

Gwalior,
Janmashtami
1946

RADHAKAMAL MUKEREE

PREFACE TO THE SECOND EDITION

The first edition of the book got exhausted earlier than was expected and consequently it was not found possible to revise the whole text. But as the work was completed during the war period, when changes of a far-reaching nature to alter the industrial structure of the country were being contemplated by the Government, it was considered necessary to add a new chapter to the book to deal with the progress of the post-war plans of the Government. For the planning of the development of individual industries or groups of industries, a large number of Industrial Panels were appointed, consisting of both officials and non-officials with knowledge of the industries concerned. The panels were required to make their recommendations in consultation with Provincial and Indian State Governments. These recommendations were to cover a wide field, viz. the extent of the development desirable and possible, the most suitable organization of the industries, the extent of the Government assistance required, the best location of units of the industries with reference to all relevant factors, the extent of Government regulation and control required, and the extent to which the industries can be developed on a cottage basis. The reports of most of the panels have been submitted.

The findings and recommendations of the panels with regard to some of the important industries have been given in the new chapter in a tabular form. But for the appreciation of the new plans of industrial development it was necessary to have a general idea of the existing industrial pattern of the country. For this purpose the first two sections of the new chapter have been devoted to the discussion of the distribution and location of half a dozen industries, not included in the earlier chapters, and the determination of the industrially developed, and backward and depressed regions of the country. The lines of the future development of the backward regions have also been indicated. In the third section, besides the summaries of the plans of development of some of the important industries, recent trends indicating the lines of future co-operation between Indian and foreign industrialists on the one hand and between the

Indian industrialists and the Government on the other, and the new industrial policy of the Government of India have also been discussed.

Most of the plans of industrial development were prepared in the years 1945 and 1946 and the panels set up five-year targets of industrial production to be achieved by 1950 or 1951. These plans were prepared on the basis of un-divided India and their usefulness was appreciably lessened by the secession of certain territories on August 15, 1947. The division of the country was followed by unheard of civil commotions, uprooting of lakhs of people from their ancestral homes and a terrible destruction of life, property and producers' goods. The migration of the masses of people from one part of the country to the other created numerous industrial problems. A very large number of Muslims who moved away from India consisted of skilled workers while a substantial section of the Hindus who moved into Indian Union consisted of industrialists, traders and financiers. As a result of these problems the productive activity was brought to a virtual standstill on both sides of the dividing line. On account of the political problems of Kashmir and Hyderabad the political unrest did not subside even long after the tragic happenings of the Punjab. The progress of the plans of industrial development was also thwarted on account of the non-availability of the producers' goods from outside, transport bottlenecks and shortage of industrial fuels like coal.

On account of the factors mentioned above, not only no progress has been made in the execution of the plans of industrial development but the country is faced with the difficult problems of declining production, rising prices and wages and general inflationary conditions. The production of most of the important industries of India reached its maximum between 1941 and 1943 and began to decline after 1945 on account of the control of prices and profits, wear and tear and non-replacement of machinery and plant. The all-India index of prices (base week ended 19th August, 1939=100) rose from 247.8 in March, 1945 to 258.3 in March, 1946 and to 292.7 in March, 1947. The declining trend of industrial production and rising trend of commodity prices is still continuing. The figures in the table opposite illustrate clearly the downward trend of industrial production.

*Annual Production of some of the important Indian industries.**

| Industry | Unit | Average 1936-37 to 1938-39 | | | | | | April to August | | | |
|-------------------|--------------|-------------------------------------|---------|---------|---------|---------|---------|-----------------|---------|--------|-------------|
| | | 1939-40 | 1940-41 | 1941-42 | 1942-43 | 1943-44 | 1944-45 | 1945-46 | 1946-47 | 1946 | 1947 |
| Pig Iron | Tons '000 | 1591 | 1838 | 1959 | 2015 | 1804 | 1687 | 1303 | 1406 | 1364.4 | ... |
| Finished Steel | Tons '000 | 833 | 1065 | 1244 | 1369 | 1253 | 1353 | 1268 | 1338 | 1169.3 | 506.8 |
| Cement | Tons '000 | ... | 1733 | 1727 | 2222 | 2183 | 2112 | 2044 | 2146 | 2017 | 817 |
| Cotton piecegoods | Yds. Million | 3975 | 4013 | 4269 | 4494 | 4109 | 4871 | 4726 | 4676 | 3863.2 | 171051576.6 |
| Sugar | Cwts. '000 | 18481 | 25841 | 23149 | 15902 | 21714 | 22439 | 21637 | 16931 | 16131 | ... |
| Paper | Cwts. '000 | 1077 | 1416 | 1753 | 1871 | 1821 | 1939 | 2001 | 1682 | 1440 | 575 |
| | | | | | | | | | | | 548 |

* Monthly Survey of Business Conditions in India, August, 1947

The war-time controls were relaxed or removed about a year ago but on account of declining production and rising prices it has again been found necessary to re-impose them. The Government of India have had under active consideration for some time the measures to be taken to combat the threat of growing inflation. They consulted the Provincial and State Ministers, leading economists, and the representatives of industry and labour. After a careful consideration of the problem in all its aspects, they announced the anti-inflation policy on October 4, 1948.

In the field of industrial production, the Government have come to the conclusion that in the present circumstances some special steps should be taken to stimulate production, and they have, therefore, decided to grant the following concessions. First, the present rules regulating allowances of depreciation on plant and machinery for income-tax purposes will be liberalized. Secondly, new industrial undertakings will be exempted from income-tax for a specified period. Thirdly, raw materials and plant and machinery imported into the country for industrial purposes will be granted a relief in respect of customs duty to the extent that this may be practicable without injury to Indian manufacturers of similar goods. In order to increase the financial resources available for industrial development and at the same time to prevent any addition to existing purchasing power it has been decided that for public companies the amount distributed as dividend should not exceed the average of the two preceding years ending with March 31, 1948, or six per cent on a paid-up capital whichever is higher. The Government has also decided to postpone the repayment of the Excess Profits Tax deposits and of refundable E. P. T. for a further period of three years. Refunds will, however, be allowed for financing purchases of capital equipment. Almost all the measures mentioned above are favourable for industrial expansion. So far as the question of a ceiling on dividends is concerned, it is based on the recommendation of the industrialists themselves and is not likely to produce any adverse influence on new investments.

In the field of Government expenditure it has been decided that the budgetary gap between revenue and expenditure going this year should be reduced as far as possible both by the Provinces and the Centre and that for the next year every effort should be made to provide surplus budgets. All avoidable expenditure will forthwith be postponed and all economies

consistent with the maintenance of efficient administration will be enforced. It is not the Government's intention to hold up development but in the present crisis it is absolutely vital to avoid all unproductive expenditure. A committee of the Cabinet has been set up to review urgently all development plans, both Central and Provincial, with a view to determining the relative priority of accepted schemes so that expenditure on such of them as are not productive or could be postponed or slowed down, without detriment to the national welfare, might be deferred or curtailed.

This decision to curtail expenditure on development plans is likely to affect the industrial development very vitally. A summary of the estimated total cost of the 5-year development plans of the Central and Provincial Governments is given below:

| Subject | (In crores of Rupees) | | |
|-------------------------------|-----------------------|------------|-------|
| | Central | Provincial | Total |
| <i>(a) Productive Schemes</i> | | | |
| 1. Electrical development | | 67 | |
| 2. Irrigation | 50 | 143 | 260 |
| 3. Posts and Telegraphs | 56 | ... | 56 |
| 4. Railway | 230 | ... | 230 |
| Total | 336 | 210 | 546 |
| <i>(b) Other Schemes</i> | | | |
| 5. Industrial development | 15 | 21 | 36 |
| 6. Agriculture | 22 | 123 | 145 |
| 7. Roads | 39 | 147 | 186 |
| 8. Education | 21 | 93 | 114 |
| 9. Medical and Public Health | 12 | 99 | 111 |
| 10. Civil Aviation | 25 | ... | 25 |
| 11. Meteorology | 5 | ... | 5 |
| 12. Broadcasting | 4 | ... | 4 |
| 13. Miscellaneous | 40 | 83 | 123 |
| Total | 183 | 566 | 749 |
| Grand Total | 519 | 776 | 1295 |

It is learnt that the new policy of deferring action on some of the development schemes will not affect the plans of the Ministry of Industry and Supply to establish factories for the manufacture of steel, heavy electrical equipment, fertilizers and synthetic oil. The expansion of the textile and cement industries will also not be affected. The expenditure of Rs. 15 crores to be incurred by the Central Government under the head of industrial development was meant for the construction and development of the Sindri Fertilizer Factory and the Hindustan Aircraft Factory, but the Provincial estimate of Rs. 21 crores was meant

for industrial training and development of cottage industries. This expenditure may not be curtailed but these figures represented only a minor item in the scheme of development plans. Three of the biggest items of development estimates, however, were intended to be spent on power-cum-irrigation projects and on the construction of roads and railways. It was estimated that the total installed capacity of the generating plants of Government and Public Utility undertakings in India, which was approximately 1,324,400 K. W. at the beginning of 1946, would be stepped up by an additional capacity of nearly 980,000 K. W. by the end of 1950, and by more than 1,500,000 K. W. by the end of 1955, as a result of the development of multi-purpose projects, such as the Bhakra Dam, the Damodar Valley Project and the Kosi Project. But in case the progress of some of such long-term projects is slowed down the plans for increasing the supply of electric power substantially will not materialize and the industrial development of the country will be affected adversely.

It is clear that on account of the division of the country in August 1947, and the subsequent political disturbances, non-availability of producers' goods and the inflationary conditions of the post-war years the First Five-Year Plan of the Central and Provincial Governments has been almost completely upset and no material progress can be expected up to 1950. But with the satisfactory solution of Hyderabad problem and the announcement of anti-inflationary measures, almost simultaneously, we seem to have turned the corner. The citizens of India do not yet realize the economic significance of the silent policy of integration and unification of the fragmented and scattered political units of the Indian Union followed by the Hon'ble Sardar Vallabhbhai Patel, who will be remembered by the posterity as the Bismarck of India, so far as the political and economic unification of the country is concerned. Let it be realized that the pre-partition plan of industrial development has now become out of date; new India requires a new plan, modified in the light of the new and tremendous economic forces released by political and economic unification. This plan has to be prepared on Regional lines.

PREFACE TO THE FIRST EDITION

India is completing her first century of modern industrialization. The changed circumstances of the world after the Second World War (1939-1945) seem to offer her new avenues and opportunities of improving her economic organization. The political changes to come are sure to enable her to shape the economic and industrial destiny of her people according to their wishes.

Even before this war, certain technical changes in the generation and use of power and transport were already depriving the industrial concentrations of some of their advantages. The war has clearly demonstrated the advantages of industrial dispersion over industrial concentration from the point of view of military strategy. The consensus of opinion now appears to be in favour of decentralized industries. The question of the location and regional distribution of industries is a very vital one, as it affects not only the means of livelihood and well-being of a nation but rather the entire question of the distribution of the total population of a country. The countries of the world in general consist of industrial and non-industrial areas; the former are densely populated while the latter have sparse population. On account of this uneven distribution of industries there are prosperous areas co-existent with depressed areas in the same country.

In highly industrialized countries like England the major part of the population is urban while in India the majority of the people live in rural areas. From the point of view of proper and scientific distribution of population, both of these conditions are undesirable. A better distribution and decentralization of industry and a better distribution of population between rural and urban areas is very desirable. In India, particularly, we have to bring about 'rurbanization' by fusing the rural and urban occupations which can be achieved only by a well-planned dispersal and location of industries on a regional basis.

There is another consideration also on account of which dispersal of industries is desirable. In India there is no liaison between agriculture and industry up to this time as it exists in

countries like Holland, Belgium and Russia. Agriculture as an industry and occupation uses little produced by the industries, as no machinery or artificial and chemical manure is generally used in this country. On the other hand, the raw materials provided by agriculture are generally sent to far-off places (generally to foreign countries) for being processed and turned into useful articles. If this undesirable state of affairs is to disappear the industry supplying agricultural implements and tools, manures, etc. or producing flour, butter, fabrics, etc. must become *local*. This change requires dispersal and movement of industries from overgrown coastal and central towns into the heart of the agricultural regions. Thus the need for decentralization and dispersion of industries is not dictated by the flying fortress, the flying bomb and the atom bomb merely but is also made imperative by social and economic problems like the clearance of industrial slums, development of depressed regions, better distribution of population and the general welfare of the people as a whole.

An attempt has been made in this work to indicate the possibilities of the establishment of this new type of industrial order in India with decentralized and dispersed industrial units. I shall regard my labour fully rewarded if this work can induce people to think on similar lines. I am very much indebted to various industrialists and Government officials all over India for the help and co-operation I received from them in the course of my investigations. More particularly, however, I wish to express my thankfulness to the following:

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TULSI RAM SHARMA

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CHAPTER I

INTRODUCTORY

The idea of regional distribution of industries and of population has been stressed in the industrial countries of the West for some time. During World War II, especially, it had attracted still greater attention on account of the strategical dangers facing the great industrial centres. In England the question of regional distribution of industries has been examined by the Royal Commission on the Distribution of the Industrial Population of Great Britain and by the Regional Development and Location of Industry groups of P. E. P. The Commission unanimously accepted that the objective of national economic planning should be the encouragement of a reasonable balance of industrial development, so far as possible, throughout the various divisions or regions of Great Britain, coupled with approximate diversification of industry in each division or region throughout the country. The Report of the Political and Economic Planning (P. E. P.) group has also emphasized the need for balanced regional development. In the U. S. A. the question of regional planning has been very thoroughly examined by the National Resources Planning Board. In 1933 President Roosevelt created the Tennessee Valley Authority to serve as a model of the process of developing backward regions and to lead, as he said, to 'national planning for a complete river watershed involving many states and future lives and welfare of millions'. The experiment was a complete success and in 1937 Roosevelt proposed the creation of seven other public bodies similar to the T. V. A. for other regions of the U.S.A.; but on account of the opposition of the utility companies and the propaganda carried on against the idea by powerful vested interests led by Wendell L. Wilkie, the American Congress failed to take any action on his recommendation.

Regional planning in the case of Germany has been mostly industrial planning. In certain other countries, particularly in France and Sweden, before World War I it sought to harmonize the interests of large industrial cities, satellite towns, country towns and villages in a common scheme in which each has its place. In the U. S. S. R. the principle has, however, been applied

on a still wider basis. Industrial development in Soviet Russia has been carried out in such a way that the distinction between agricultural and industrial regions has been obliterated and backward villages and congested industrial centres have practically ceased to exist. Dr Radhakamal Mukerjee is probably the first notable Indian writer to stress the co-ordination of regional town and village planning in this country; and in his general sociological treatment associates the present disorder in technology in India with the disorder also in man's relations with his environment and his social and institutional set-up. Speaking about the Soviet planning he observes that 'in Russia, regional planning began with the proper placing of industries and transportation for the nation. Cities are so located and developed that these utilize land to the best advantage and do not overstep an appropriate dimension. Stalingrad is a good example of regulation of the size of cities on the basis of social and industrial efficiency.' He suggests for India the adoption of an economic plan like that of Russia for offering differential advantages in favour of industries in the raw material and undeveloped economic regions losing sight neither of the programme of inter-regional distribution of labour and resources nor of the present economic unbalance and over-crowding in agriculture in the backward areas.¹

From the economic point of view Dr P. S. Lokanathan has given a brief and general account of the locational trends of the Indian industries in his book *Industrial Organization in India*. But so far no attempt has been made to examine the distribution of industries on regional lines. In theory the policy of the Government of India regarding reconstruction planning for the post-war period, as reflected in the statement of Sir Ardeshir Dalal, ex-Member of the Viceroy's Executive Council for Development and Planning, appears to be based on regionalization. Sir Ardeshir, in a statement to the press on September 14, 1944, said. 'The Government is keen on regionalization and dispersal of industries, as widely as possible, subject, of course, to the availability of natural resources.' The Reconstruction Committee of Council of the Government of India, in their second report on Reconstruction Planning also admit the shortcomings of industrial planning and development according to artificial political boundaries.

¹ See Preface to Planning in *Economic Problems of Modern India*, Vol. 2 By Mukerjee & Dey.

But in practice whatever little is being done in respect of post-war industrial planning and development seems to be going on on the basis of existing political boundaries of provinces and states. Even in the Memorandum prepared by the Office of the Economic Adviser to the Government of India on the 'Location of Industry in India' to serve as a basis of discussion, scant regard has been paid to the regional idea. All the statistical data in various tables are placed haphazardly on the political basis of provinces and states without any attempt at regional grouping. Sometimes (as in the case of jute industry) the word 'region' has been applied indiscriminately to the territorial units of vastly different sizes such as the French Settlements and the entire province of Bengal.

This shows that we have not found it possible as yet to move beyond the narrow limits set up by political divisions even in the matter of planning for the future economic and industrial development of the country. The various provinces and states are planning for themselves within the limits set up by their political boundaries. These boundaries of provinces and states are the results of certain historical events, like wars, conquests and treaties. They are absolutely arbitrary and are not related to the distribution of natural resources in any way. In the majority of cases they stand in the way of better economic and industrial development of the country. Even in Europe where the different countries comprise compact blocks of territory the political boundaries have created many insoluble economic and industrial problems. The electrification of the Upper Rhine Valley and the mutual dependence of Lorraine, Luxemburg, the Saar Basin and the Ruhr Valley for raw materials, power resources, market and credit conditions, etc. furnish some examples of such problems.

- In India the confusion created by the myriads of political units is perhaps without any parallel in the world. The country is not only divided between the British Indian provinces and the Indian states, but some of the important Indian states like Baroda are interspersed with British territory; the territories of some of the big states like Gwalior and Indore are not contiguous; the Deccan and the Gujarat states cut the province of Bombay virtually in three parts, while the Sikh states cut the province of the Punjab at its narrowest part along the Sutlej-Bias line into two parts; the province of Orissa is interspersed with the states of

Eastern India Agency; some of the states of the Western and Central India Agencies are smaller (from the revenue point of view) than the estates of some of the Taluqdars of Oudh; and the province of Ajmer is a mere speck in the centre of Rajputana states. This arrangement of political units is anything but conducive to efficient economic and industrial development of the country. 'Schemes of regional development, agricultural and industrial, such as afforestation, flood control, drainage, irrigation, horticulture, super-power, decentralization of industry and co-operative organization are as important for India's economic future as inter-provincial and inter-regional undertakings of transportation and communications.' Without inter-regional and inter-provincial co-operation no such projects are feasible.

These schemes cannot be carried out piecemeal by different authorities in different sections of the same region; nor are they within the orbit of financial resources of smaller political units. They can only be undertaken by a regional group of a number of political units or administrative provinces. On the other hand, Indian federalism presents its special problems of regionalism and co-ordination. 'In a vast and heterogeneous nation like India, regional geography and ecology are central facts, and the tasks of statesmanship consist in co-ordinating the divergent lines of development and special interests of different regions and sections and bringing them all together in a common economic policy. On the one hand, the economic diversity between the regions of the U. S. A., the U. S. S. R. and India is one of the strongest binders fostering a national unity operating through regional division of labour. On the other hand, federalism as a political experiment is bound to fail in the absence of economic interpenetration and right balancing of the interests of different regions, localities and sections.'²

Economic necessity is, in fact, compelling India to move beyond the artificial political boundaries of the provinces and states to take concerted action for the development of economic resources and industries. At times, the different provincial and state authorities have co-operated in certain limited spheres. The irrigation project in the valley of the Sutlej river was financed jointly by the provincial government of the Punjab and the state governments of Bahawalpur and Bikaner; a joint sugar

² R. K. Mukerjee: *Man and His Habitation*, p. 298.

³ R. K. Mukerjee: *Social Ecology*, pp. 313-14.

commission set up by the provincial governments of the U. P. and Bihar is controlling the sugar industry of the two provinces; the governments of the U. P. and the Punjab have agreed to develop the hydro-electric power on the Tons and Giri rivers jointly; the governments of the Hyderabad State and Madras have decided to finance jointly the construction of an irrigation-cum-power project at Malapuram on the river Tungabhadra; and there is also the possibility of a similar project being financed jointly by the governments of Bihar and Bengal in the valley of the river Damodar. It is remarkable that in all the above mentioned cases, with one single exception of the sugar industry of the U. P. and Bihar, the field of co-operative action has been provided by a river valley unit. The time has now come when the political units of the whole country should be grouped together in a number of suitable economic regions, and regional councils representing various interests should be set up to explore the possibilities of industrialization by undertaking extensive surveys of natural resources and to assist the industrial development of the country on regional lines. The broad economic regions may be further sub-divided, preferably on the basis of river valleys and mineral areas, for the purposes of efficient survey and development.

A scheme, that might ultimately serve as a model of development on these lines for the whole of India, appears likely to be taken in hand. A multi-purpose project for developing the valley of the river Sone was also discussed at Delhi, at a meeting between the representatives of the Central Government and the Governments of the U. P., the C. P. and Bihar and certain Indian State representatives. The project is intended to utilize the waters of the river Sone for increasing irrigation, development of power, navigation and flood control. Irrigation engineers and other experts have visualized the possibility of installing electric plant for providing energy over an area of 175 to 250 sq. miles.

It is a modest scheme when compared with the Tennessee Valley project of the U. S. A., which covers an area of about 40,000 sq. miles. But it will be very important as a novel experiment, really the first of its kind in India, to be extended to other parts of the country, if found successful. In the development of river valleys on these lines, there exists a natural cycle of causes and effects. To obtain facilities of cheap electric power, navigation and flood control means dams and reservoirs. To keep reservoirs deep and effective means erosion control,

which calls for forest management. And the forest industries can be planned in suitable localities with electric power generated at the dams and reservoirs. To the industries in the plains it means the supply of cheap electric power and transportation; to the farmer it means the benefit of rural electrification; and to the people living in the deltas of such rivers it means freedom from the havoc to life and property wrought periodically by floods.

There is an organic inter-connexion between forests in the mountains, pastures on the mountain slopes and agriculture in the plains. Forestry in the hills, pasture farming in poor and cheap lands and scientific agriculture in fertile plains help one another. Full development of forest or mineral zones, stock raising zones, and cereal, raw produce and agricultural zones, requires the establishment of varied types of industries to utilize the diverse resources of these zones by treating them all as parts of a single unified broad region for planning and development.

This kind of development of industries (including agriculture) on regional lines is a real departure from the nineteenth century destructive utilization of natural resources to the present-day economy of conservation. According to the nineteenth century conception, economic balance was to be achieved on a world-wide basis through an international division of labour. Certain countries like England, rich in minerals like coal and iron, utilized their resources for the mass production of textiles, cutlery, and other machine made goods, while others like India devoted themselves to the raising of food crops like wheat and the production of raw materials like cotton, jute and oil-seeds and served as consumers' markets for the products of industrial countries obtained in return for their agricultural surplus. The same process was repeated on a smaller scale between the industrial and agricultural regions of different countries. This kind of economy is destructive in the sense that it leads to the exhaustion of the mineral wealth like coal or petroleum in the manufacturing country and the impoverishment of the land in the agricultural country on account of excessive exploitation of the soil for the purpose of raising cash crops and failure to return to the soil the necessary ingredients of plant food. The result of the process is misery of the people both in mining and agricultural regions.

Regional economy seeks the goal of conservation in a reduction of the rate of disappearance or consumption of exhaustible

resources and a corresponding increase in the unused surplus left at the end of a period for the purpose of benefiting posterity. The social aims of regional planning are to arrest the concentration of population and industry in a few super cities or metropolises and the growth of agglomerations or 'conurbations', i. e. the grouping of settlements which are attached to one another and are oriented to one big city or metropolis; to create independent little towns where a further increase of population in the region can be absorbed and people may live more harmoniously with nature and industry. Regionalism thus aims at a continuity of the vast current of resources, energies and services for the permanence of the community through conservation and implementation, not through exploitation, and the transformation of these resources, energies and services into higher values furnishing a permanent dynamics for human culture free from the artificiality and emptiness of the technological society.* It establishes an equilibrium between the people and the heritage of the region.¹

But the regional distribution and development of industrial and economic activity does not and cannot aim at anything like self-sufficiency. No region is rich enough or varied enough to supply all the requirements of all the industries necessary for modern civilized existence. The regional distribution of industries only aims at a more even development of the local resources of the country as a whole. Under this type of industrial distribution the industries would be varied and balanced locally in order to secure a varied and balanced life in different regions of the country.²

The regional distribution of industries, as it does not aim at self-sufficiency of different regions or countries, cannot lead to stoppage or shrinkage of inter-regional or international trade. The surplus produce of every region will flow to the neighbouring regions and even beyond the national frontiers. The regional distribution will simply bring about a change in the composition of the streams of inter-regional or international trade. The pure streams of manufactured goods from industrial regions and of raw materials from agricultural regions will be replaced by mixed streams of manufactured goods and raw materials both ways.

The economic resources of India are vast and varied. She is, next to the U. S. A., the biggest producer of raw cotton, with

⁴ R. K. Mukerjee: *Social Ecology*, pp. 316-18.

an annual estimated production of seventy lakh bales (400 lbs.). She enjoys a monopoly of jute, the world's cheapest packing cloth, of which she produces ninety lakh bales per annum. Her supplies of wool are abundant. India today is perhaps the largest producer of oil-seeds. She ranks first among the world's tobacco producers. She produces the largest amount of cattle hides. Her forest resources are ample, covering an area equal to one-fifth of her cultivated area. She is equally well endowed with mineral resources. The total coal reserves are estimated at 600,000 lakh tons. Next only to the U. S. A. and France, India has the world's largest reserves of iron ore of the richest kind. She has the biggest reserves of manganese ore and three-quarters of the world's supply of mica. She is the world's main source of ilmenite, monazite and zircon. Chromium is available in sufficient quantities and there is no serious deficiency of tin, lead, copper and zinc. She is rich in aluminium ores and good reserves of sulphur have been discovered in Baluchistan. She is poorly equipped with petrol, but there is vast scope for the production of power alcohol from molasses and of producer gas from coal. Besides this her water power resources are only second to the U. S. A. With a few exceptions these resources are well distributed. What is really required to make India prosperous and industrially great is a proper utilization of these resources by developing industries of a varied nature, on a regional basis, throughout the country.

In the present work an attempt has been made to examine the locational trends and the regional distribution of six selected important industries of India. The following nine chapters (with the exception of Chapter VII) have been devoted to these major industries. The earlier theoretical portions of all these chapters are based on Alfred Weber's theory of Industrial Location, as developed further by B. Ohlin in his treatise, *Inter-regional and International Trade*. In the later parts, after considering the existing distribution of these industries in different regions, suggestions have been made regarding the extension of these industries into other regions, taking into account natural resources, markets and other locational factors. Up to the time of the World War of 1914-18 industrial activity in India was mainly concentrated in the coastal regions around Calcutta and Bombay. But since then, on account of the gradual economic development of the regions of the interior, a considerable distribution of the

industries into other regions has been taking place. As yet there is enough scope for encouraging the dispersal of industries still further in the post-war period.

With the exception of sugar and jute, the distribution of the remaining industries has been considered on the basis of five broad regions: (1) Western India, (2) Rajputana and C. I., (3) C. P. and Hyderabad, (4) Southern India, and (5) Northern India. A certain amount of flexibility has been observed in including the areas under these regions. The sugar industry has been treated on a slightly different basis mainly because it is closely related to agriculture and is dependent for its success, to a large extent, upon the natural environment. The climatic conditions in the tropical (southern) and sub-tropical (northern) regions of India affecting the growth and development of sugar-cane are widely different and give rise to different problems. On account of these differences the distribution of the industry has been discussed on the basis of two regions—Southern India (tropical) and Northern India (sub-tropical). The cultivation of the thick and the thin varieties of cane in Southern and Northern India respectively has also been partly responsible for the division of the country into these two regions. So far as the jute industry is concerned, it is mainly confined to the province of Bengal.

In arranging the distribution of industries on a regional basis a very great difficulty has been experienced on account of the lack, or unsuitability, of the statistical data. The Government of India while publishing the figures of production of certain selected industries give the production of all the states as one item in spite of the fact that some of them like Mysore are now industrially more advanced than the British Indian provinces of Assam or the N.-W. F. P.

Means of communication, especially the railways with their freight policies, have profoundly influenced the distribution and location of industries and have been mainly responsible for the congestion of industries in the port towns. These influences, along with the post-war development plans, have been examined in Ch. XI. The part played by skilled labour in assisting the localization of different industries in important centres has been discussed in Ch. XII. At the end of these chapters, constructive suggestions have been made for remedying the shortcomings.

In the rural areas of India, agriculture is the mainstay of the people and on account of the lack of subsidiary occupations the

income of the rural dwellers is very low. The gap between the incomes of the inhabitants of rural and urban areas can be narrowed down by the extension of industrial activity into the rural areas of the country. In Western countries, as pointed out earlier, the distinction between the agricultural and industrial regions is fast disappearing. While discussing this matter Prof. J. Russell Smith has observed: 'Perhaps the regional specialization of manufacture, like the regional specialization of agriculture has gone too far. There are signs that it has. We may yet have a renewal of manufacture for local needs as we are already having of agriculture for local needs. Two comparatively new factors make this possible. One is the wide distribution of electric power in town, village and home. . . . The second factor is standardization. These two factors make it possible to manufacture many small things in small villages, possibly even in farm homes.' It may become easier to transport man's raw materials and his produce than his food. It is possible that ~~we are at the~~ beginning of an era of partial redistribution of manufacturing over the land where food production and climate and commercial access are good.'

In India also there is a great possibility of the extension of industrial activity into rural areas as a result of post-war hydro-electric development for providing power to these areas. The prospects of electric power development and rural industrialization have been discussed in Chapter XIII. The earlier part of this chapter has been devoted to an examination of the possibilities of the establishment of regional electric power grids. It has been shown that the establishment of five regional grids and at least two inter-connected systems is a distinct possibility. In the later part of the chapter a number of industries, falling mainly into three groups—(1) Textiles, (2) Light Metals, and (3) the Processing of Agricultural Produce—have been suggested as being suitable for establishment in rural areas.

It is expected that these industries, when established in different regions, will give rise to a number of towns of a moderate size, which will draw off the surplus population of the rural areas and will provide the necessary centres for the extension of banking, insurance, education and medical facilities, and certain amenities of social life such as reading-rooms, libraries, cinemas, etc. Such a change is likely to reduce the unusually high proportion of rural population and to bring about a better social structure.

Industrialization in India has not gone very far and the number of large industrial cities which give rise to problems such as those pertaining to rebuilding, slum-clearance and the restricting of their further growth, may not be more than a dozen. But the distribution of industrial activity in the different regions of India is extremely uneven, and the distribution of population between agriculture and industry is equally uneven. These disparities give rise to a number of social, economic and other problems. Chapter XIV has been devoted to a discussion of the hygienic, social, economic and strategical dangers and disadvantages arising out of the present uneven regional distribution of industries in India. The problems of stabilization of war industries and of the location and distribution of basic and light consumers' goods industries likely to be established in the post-war period have also been taken into consideration. As a solution of all these difficulties and problems, the necessity of a planned redistribution of industries on regional lines under the guidance of a Central Planning Authority has been emphasized. It is possible for India to avoid the evils of Western industrialization by planning her future industrial programme on regional lines.

In spite of the limited nature of the enquiry, confined to six important industries, the wide field of investigation extending nearly over the whole of India presented many difficulties. The suspension of certain important statistical publications, denial for reasons of security of information regarding the production of certain industries like iron and steel, and of certain new schemes like the hydro-electric projects, and the withholding from publication by the Government of certain important documents like the reports of the Grady Mission, the Handloom Fact Finding Enquiry Committee, the Committee of Power Engineers, etc. created many obstacles.

Despite these difficulties and obstacles an attempt has been made to present a clear picture of the existing distribution of the industries, selected for study, in the various regions of the country; the shortcomings of such distribution have been pointed out and remedies suggested. It is hoped that the work will serve a useful purpose as a basis for further investigations regarding the regional distribution of other industries..

CHAPTER II

FACTORS IN THE LOCALIZATION OF COTTON TEXTILE INDUSTRY

Centuries ago when Western Europe, the birth place of modern capitalism, had little industrial production to boast of, India was famous for the high artistic skill of her craftsmen. Her cotton manufactures were in universal demand not only in the Eastern markets from Cairo to Pekin¹ but were equally eagerly sought for in the European markets. Indian calicoes were so popular in England in the eighteenth century that in vain did Manchester attempt to compete with them on fair free trade principles, and their entry into the English market had to be stopped by legislation. The exports to these overseas markets consisted of more than two hundred varieties of cotton textiles, the manufacture of which was scattered throughout the whole of India. Although a fairly large number of varieties of these cotton fabrics were manufactured in most of the regions, different provinces specialized in the production of certain well-known varieties of cloth. The first place among piece-goods was given to Dacca muslins of Bengal known as *Ab-i-ravan* (running water), *Baft-i-hawa* (woven air) and *Shab-i-nam* (evening dew).² Southern India specialized in plain and printed cloth to such an extent that Calicut gave its name to calicoes and the chintzes of Masulipatam acquired a world-wide celebrity.³ Burhanpur in the Central Province was noted for gold-wrought⁴ cotton tissues which seemed like woven sunshine¹ and Baftas, which, besides taffatis, comboy, and other types of cloth, provided cargoes to the ships leaving the ports of Surat and Cambay, came mostly from Ahmedabad, Baroda, Broach, Navasari and other towns of Gujarat.

The Indian cotton textile industry, responsible for the production of these fine fabrics, was organized on a handicraft basis as was also the case with the contemporary industries of England and Europe. But certain inventions, at this stage, revolutionized the art of spinning and weaving in England and the use of power to drive the newly invented machinery enabled her to

¹ Birdwood: *Industrial Arts of India*, 1880, p. 276.

² *Ibid.*, p. 259.

³ *Ibid.*, pp. 256-57.

⁴ *Ibid.*, p. 250.

turn out cheap cotton goods on a large scale for sale overseas in the countries of her growing empire. To the misfortune of the Indian industry, however, the country's political sovereignty was lost, and 'the political subordination of India not only led to the strangulation of India's European trade, but at home she was left completely at the mercy of England, who forced upon her cotton piece-goods without the payment of any duty.'⁵ This competition from the growing machine industries of the West increased, and as a result the Indian cotton industry lost the greater part of its remaining markets for piece-goods in Africa, the adjacent countries of Asia and the Indian archipelago, and a substantial part of the home market. Consequently India, the home of muslins and chintzes, which once held the monopoly of cloth markets in Asia, Africa and Europe, 'was now well started on the road to transformation from being the industrial workshop of the world to one of its richest raw material producing regions.'⁶

— Besides these political factors, the economic organization of India was also not favourable for an easy transformation of the industries from handicraft to factory stage. In the case of England, the establishment of cotton textile and other factories was preceded by the engineering, the iron and steel, and the machine industries and by the development of water and steam power for running the machinery. In India, however, there were no engineering or machine industries and the coal mines were practically unknown before 1774. Good means of communication in the form of metalled roads and railways were entirely non-existent. The first regular working of coal mines was started by Messrs Alexander & Co. as late as 1820, and the first section of the East India Railway was opened in 1854.

In the absence of any attempts on the part of an alien government to assist the decaying indigenous cotton industry or to protect it against unfair foreign competition, the political and economic factors brought about the ruin of handicrafts without replacing them by factories of the Western type. Thus there was a definite hiatus between the decay of handicrafts in the eighteenth century and the beginning of modern factory industries in the nineteenth.

Now, in order to be in a position to examine the factors responsible for the location of the pioneer cotton mills in the latter

5 R. K. Mukerjee: *The Economic History of India, 1600-1800*, p. 162.

6 *Ibid.*, p. 183.

part of the nineteenth century, a consideration of the relative position of the productive factors like capital, entrepreneurial ability and skilled labour in different parts of India is essential, because the location of industries is affected by the availability of these factors, which in turn is itself a product of the earlier situation. The establishment of early British rule in the eastern and southern provinces of India affected profoundly the supply and the nature of these factors in these parts. The acts of oppression and tyranny perpetrated by the agents and the servants of the East India Company, who abused their newly acquired power to the utmost for achieving their own selfish ends, resulted in a wholesale abandonment of their occupation by the weavers and other highly skilled workmen. The passing of the internal trade of the country even in such petty things as betel-nuts, straw and bamboos⁷ into the hands of the Gomastahs of the foreigners, the utilization of the net revenues of the country for the purchase of commodities of trade by the Company for sale in Europe, and the farming system of zemindaris killed the indigenous business and industrial energy and enterprise entirely. The indigenous capital, managerial ability and skilled labour became scarce and European capital and entrepreneurs, in their place, confined themselves mainly to foreign trade, plantation industries such as tea and indigo and the development of transport industries (including coal for steamers and railways) necessary for the distribution of the manufactured goods imported from abroad and for the collection of raw materials for export to England and Europe. They were not interested in the development of the manufacturing industries in India at this stage. The political and economic conditions prevailing in Southern India at that time were nearly similar to those of the province of Bengal.

Western India, where the English rule could not be established so firmly till after the final defeat of the Marathas, was the only part of India where the business community escaped the fate suffered by its peers in other parts of the country and continued to share the trade and commerce of the western coast of India and the adjacent countries with the Europeans. About the nature and extent of that share the following remarks of the Industrial Commission (1916-1918) are worth quoting: 'In Bombay the Indians have held a large and important share in

⁷ R. C. Dutt: *The Economic History of India under early British Rule*, p. 23.

the trade of this place since the city first came into English hands. The Mohamedan of the west coast especially traded by sea with the Persian Gulf, Arabia and East Africa from much earlier times. The Parsees and Hindus from the Northern Bombay coast districts are recorded, at the beginning of British occupation, as taking with the Mohamedan sects of Khojas, Memons and Bohras a most important share in the trade of the port as contractors, merchants, financiers and ship-builders, and have throughout shown themselves little, if at all, inferior to the European and usually in command of more capital.

'The valleys of Narbada and Tapti had been for ages devoted to the cultivation of cotton. A considerable export trade was carried on from Broach and Surat, the ports at the mouths of these rivers, with the aid of an efficient maritime population. The Parsee also after settling in this tract secured a share of the trade; with the silting up of these rivers and the increase in the size of the ships, Bombay became the centre of the trade from the west coast of India.'

Later on in the nineteenth century, when trade with China and the Far East was opened up, the Parsee traders of Bombay shared in the yarn trade of China with the British merchants and some of them established their own branches at Hong-Kong. Some of these Parsee merchants realized that Bombay itself could provide a very good venue for the manufacture of yarn from the Indian cotton for export to the China market. The import of coal from England solved the problem of power and the first cotton mill in Bombay was started by Cowasji Nanabhoy Davar in 1851, and by 1860 two more mills were added. Thus the early cotton mill industry of Bombay was not started to serve the home markets but was rather intended to supply yarn to the overseas foreign markets in China and the Far East. And there is nothing surprising, therefore, in the first appearance of the cotton mill industry at Bombay—a port town of new growth—to the exclusion of not only the old cotton textile centres of Bengal and Madras but also of Gujarat and the cotton belt of Western India.

At this date Bombay was most favourably located with regard to all the productive factors. The leading Parsee and Bhatia merchants of Bombay had already acquired good fortunes from foreign trade, especially the cotton and opium trade with China, and their financial position was further strengthened

⁸ Report of the Indian Industrial Commission (1916-18), p. 65.

during the American Civil War, when Bombay had to export raw cotton worth more than Rs. 360 lakhs a year to fill the lacuna created by the stoppage of American exports. Gold and silver poured into Bombay in profusion and a part of these funds found its way into the cotton mill industry. Most of these merchants had learnt during the course of their trade, the methods of modern finance and industrial organization, and knew the way to utilize their funds and the financial facilities of a modern centre like Bombay for the promotion of large industrial concerns. Their intimate knowledge of the cotton trade enabled them to exercise personal control over the details of the working of cotton mill companies and the technical skill and experience was made available by the machine making firms of England. The local agents of these firms arranged for importing, along with machinery, skilled and technical labour from Lancashire not only to fit up and supervise machinery but also to manage the mills using their machinery.

The supplies of raw cotton for Bombay mills were available from the hinterland of the port of Bombay itself. The leading position which the port had already acquired with regard to the export of raw cotton, was further improved during the American Civil War when the cotton crop not only of the Bombay province but also of the neighbouring regions gravitated in large quantities to this port for export and a special flow of cotton to Bombay to feed the new cotton mills had not to be created.

Owing to the absence of chemical and engineering industries in India, mill stores and machinery for these pioneer cotton mills had to be imported. Bombay being an important harbour in the world trade, it was easy to import all these things from abroad, especially from England. For the supply of unskilled labour Bombay depended upon the coastal districts and the Deccan and gradually enough workers were attracted to the mills from the Ratnagiri district and other parts of Bombay Deccan. The humidity of Bombay was also a climatic advantage for the spinning of cotton thread. Thus, in every way Bombay was an excellent site for the pioneer cotton mills of India, which obtained most of their requirements (except raw cotton and unskilled labour) from England and disposed of their finished goods (mostly yarn) in the China market.

A vast and profitable export trade in yarn that was built up with China continued to be the main controlling factor in the

development of the mill industry of the Bombay island until the late nineties. This very factor was also responsible for two of its special features. First, the spinning side of the industry developed out of all proportion to its weaving section and secondly, cotton mills in such large numbers were erected in so limited an area that by 1890 there were 70 mills in the island of Bombay. At the end of the nineteenth century Bombay alone represented more than half the installed capacity of the whole of India, and in spite of a few mills here and there, this island city with its 82 cotton mills could justly be called the 'Cottonopolis' of India.

The reasons for this early concentration of cotton industry at Bombay are to be sought for in the superiority of transport relations of this centre over the centres of the interior. As Bombay had to obtain its 'goods of the first order' (raw materials) and 'half-materials' (machinery and mill stores) from long distances and had to place its goods in equally distant markets, the geographical distance relations of its industry seem to be unsatisfactory; but it has to be borne in mind that for influencing the location of industries it is the transport relations and not the distance relations that have economic importance. Sea transport is always cheaper over long distances and places on the sea-coast enjoy favourable transport relations, if harbour facilities are available. Bombay being a port with a fine natural harbour enjoyed the advantage of cheap sea freights on her imports of machinery and mill stores and on her exports of finished goods to the China market. For the transport of raw cotton from the interior to Bombay the railways (when opened) also offered comparatively cheap rates. Thus in spite of its producers' buying markets and consumers' markets being situated at long distances, the Bombay cotton industry enjoyed especially favourable transport relations.

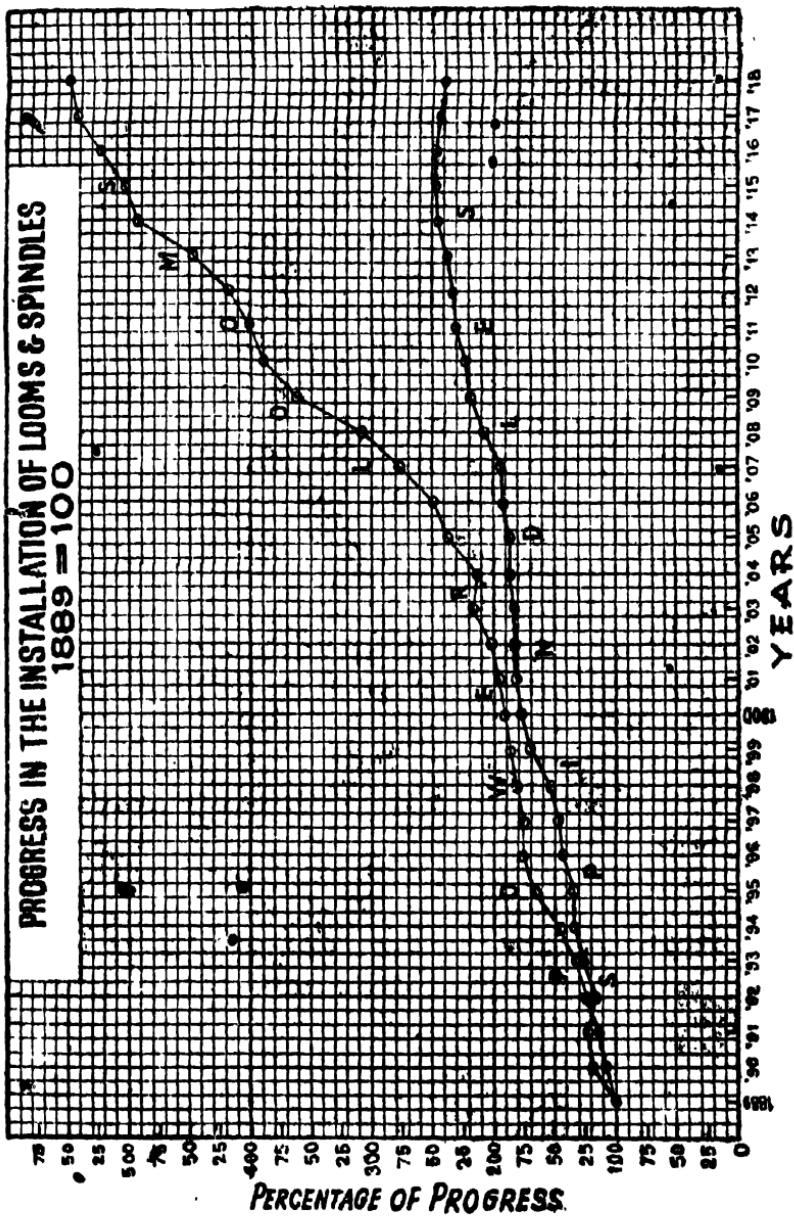
The nature of raw material and its transportability also influenced the initial concentration of the industry at Bombay. Cotton fibre is a 'pure material' in the sense that it does not lose much of its weight in the process of manufacture. Raw cotton and the finished product (yarn or cloth) are transportable with equal ease and the cost of transportation is such a small fraction of the total cost that raw materials and the finished goods can move long distances without any appreciable addition to this cost. Thus there is nothing in the nature of the fibre or its transportability to bind its manufacture to the place of production of

raw cotton, or to make the cotton industry 'raw-material' localized, if the raw material producing centres are less favourably situated with regard to other productive factors. It was the superiority of Bombay over the raw cotton producing centres of the interior with regard to such other productive factors that enabled it to draw within its bounds the major portion of the cotton textile industry of India.⁹ Moreover, having regard to the texture and the length of the fibre, raw cotton should be treated as several raw materials rather than one, and for efficiency and success in spinning and for reducing costs of production, grading and mixing of a number of varieties is essential. The choice and selection of various varieties for these purposes is much easier in big and organized assembling markets of cotton like the Mulji Jetha of Bombay than in any of the producing centres dealing only in one or two varieties of cotton.

After the initial concentration at Bombay, the second phase of the Indian cotton industry began with the development of cotton industry in Japan and China. Japan appeared on the scene as a competitor in the Chinese and the Far Eastern markets towards the closing years of the last century. In the year 1906 the percentage shares of India and Japan in the Chinese yarn trade were 77 and 23 respectively, but during the Great War of 1914-18 Japan got a free hand in the Far Eastern markets and made full use of the opportunity. The scales were turned against India and by the year 1924 the ratio between India and Japan in the Chinese yarn market was reversed. The share of India declined from 77 per cent to 24 per cent while that of Japan shot up from 23 per cent to 76 per cent.⁹

These developments in the countries of the Far East brought about important changes in the organization of the Indian industry. In place of producing goods for export overseas, the Bombay industry had to transform itself into one catering to the home market. The demand in the Chinese market was mostly for yarn but the home market required cloth. Therefore, in order to make the necessary adjustment, the industry was called upon to take up the installation of a considerably large number of looms, and to scrap at the same time an equally large number of spindles, no longer required to spin for the Chinese market. Fortunately for the industry the newly started Swadeshi movement came to

⁹ Report of the Indian Tariff Board (Cotton Textile Industry Enquiry), Vol. I, p. 96.



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its rescue and sustained the spindles that were likely to be rendered idle by the loss of the Far Eastern markets for yarn. In spite of this timely help, some difficulties of reorganization had to be overcome, because the Swadeshi agitation, being on the whole a middle-class movement, gave impetus to a demand for finer counts, while the demand in the Chinese market was mainly for coarser counts. Whatever might have been the difficulties of reorganization, the change from the spinning of yarn to the weaving of cloth and from coarser to finer counts was a very desirable one in the interests of the Indian industry. Up to the year 1903, the rate of progress in the installation of looms and spindles was uniform but after 1905, the number of looms began to show abnormal increase and by the year 1918 recorded a rise of about 600 per cent while the number of spindles increased only by 250 per cent during the same period.

The rise of the cotton industry in Japan and China was not only depriving the Bombay cotton industry of its overseas markets but the Japanese cotton textiles were also beginning to invade the home markets of the Indian industry. The corner-stone of the success of the industry at Bombay was the possession of an excellent harbour and the resultant transport relations, which enabled it to obtain the machinery and the mill stores from overseas and to place its products in the Chinese market on favourable terms. But when Japan appeared as a competitor, she took advantage of the same factors to place her goods in the Bombay market at a cheaper rate than the corresponding Bombay product.

A very serious drawback in the way of the Bombay cotton industry in facing the foreign competition from Britain and Japan was that, in spite of a very brilliant start and concentration in the beginning, it failed to develop the agglomerating tendencies similar to those of the English cotton industry of Lancashire region, which could have enabled it to reduce the cost of production and to bring the prices of its goods in line with those of its competitors. As the Lancashire industry affords a unique example of the development of such tendencies a brief description of them may not be out of place here. (a) While with the development of the Lancashire region excellent storage, loading and unloading facilities had already come into existence at Liverpool, the construction of the Manchester Ship Canal resulted in the most efficient organization and combination of the various means of

transport, enabling the industry to obtain its raw materials from America, Egypt, and India and to distribute its products throughout the world at the most economic rates.

(b) Subsidiary and allied industries to supply the main textile industry with machinery, bobbins, sizing materials and chemicals sprang up in the vicinity and some of the manufacturers, e.g. Messrs Platt Bros of Oldham, acquired world fame for the fabrication of textile machinery. Besides these, a large

number of workshops for the repairs of machinery were set up just near the mills and so far as skilled and specialized labour is concerned, the workers and engineers of Lancashire still stand unrivalled in the world and are mainly responsible for the superiority of high class British goods. A son often succeeds to his father's place in the mill and the skill of the Lancashire operative may well be said to be hereditary. (c) In the specialization of functions of component units for a full technical development of the industry to obtain maximum advantage of large-scale production the Lancashire industry has gone very far. Spinning and weaving have been separated from one another and are generally carried on in different centres. As further specialization, different mills in different centres devote themselves to the production of different ranges of counts. The northern towns of Burnley, Blackburn, Preston, etc. take the lead in cotton weaving, while Oldham and Bolton are most noted for cotton spinning mills, the former being engaged chiefly in the production of medium yarns, the latter of the higher counts. The city of Manchester itself has now ceased to be so strictly a manufacturing city and has become a sale and storage depot for the products of the surrounding towns.

But at Bombay beyond the development of storage, loading and unloading facilities, no other important development worth the name, not even the starting of subsidiary industries, took place. With respect to technical specialization of the component units, up to the year 1900 the spinning side as opposed to the weaving section appeared to be making a rapid progress, but later on both the functions came to be performed under one and the same shed. And, moreover, the different units did not specialize in any particular range of counts.

THE LANCASHIRE COTTON REGION



Thus the cumulative forces which tend to reduce the cost of production and favour concentration did not develop at Bombay to any appreciable extent. But on the contrary, deglomerating tendencies which act against local concentration came into full play. (a) Bombay being an island, the area available for sites for the ever increasing number of mills and factories was naturally limited and, therefore, land values and rents rose very high and the problems of housing labour became very acute. (b) The narrow coastal strip adjoining Bombay island being separated from the mainland by the Western Ghats, the supplies of certain articles like milk, vegetables, and other articles of food became scarce and consequently the cost of living began to rise. (c) The provincial and local taxation increased. Between 1914 and 1926, the assessments for general tax and Halalkhore tax were increased by 87½ per cent and in addition the rate of the tax was raised from 9½ per cent to 11½ per cent. The charge for water was increased from 8 as. to Re. 1 per thousand gallons. A further special tax of Re. 1 per bale on all cotton consumed in the mills was also imposed to provide funds for improving housing accommodation for the mill hands.¹⁰

With changes in the nature of the consumers' markets and production, Bombay lost the advantages of special transport relations. As the emphasis from the foreign yarn markets shifted to the internal piece-goods markets, the enormous distances of land transport involved in the distribution of goods in the different regions of the sub-continent of India increased the transport costs considerably. Later on, a change in the earlier freight policy of the Indian railways, discriminating in favour of the port towns, and the consequent gradual introduction of more uniform rates based on distances, further reduced the advantages enjoyed by Bombay over the inland centres in respect of the transport relations.

The regional differences in the supply of labour, its efficiency and wages also affected the Bombay industry adversely. On account of the high rate of absenteeism and the 'Badli system'¹¹ in the Bombay mills, the improvements in the efficiency of labour could not keep pace with the rise in wages, which took place owing to the higher cost of living. Of the manufacturing charges per spindle per day, wages in Bombay amounted to

¹⁰ Report of the Indian Tariff Board (1927), Vol. II, p. 39.

¹¹ *Ibid.*, p. 138.

5.04 pies as against 3.86 pies in the up-country mills and the wages-cost per loom per day amounted to 317.64 pies in Bombay as against 255.50 pies in the up-country mills.¹² The wages in Bombay rose higher not only absolutely but even in relation to efficiency. All the adverse factors discussed above combined to set a limit to the further growth of the cotton mill industry at Bombay.

But with the gradual economic development of the regions of the interior, the conditions for the establishment of cotton mills there were becoming more favourable and inviting. The main cotton belt of India, producing the major portion of raw cotton which found an outlet through the port of Bombay, lay just across the Western Ghats, where the climatic and soil conditions in the black soil cotton region of the Deccan tableland are very favourable for the growth of cotton. The export trade in raw cotton had already given rise to a large number of important raw material collecting points in the different areas of the cotton belt. These points not only ranked as concentrated raw material sources but also represented concentrated consumers' markets, as they were the centres of the market areas in their surrounding districts, each having the weight of the consumption in that area. Most of them, if selected as sites for the establishment of cotton mills, offered the possibility of saving double freight—on raw cotton as well as on finished goods. The skeleton of the main railway lines, which had been penetrating farther inland from the main ports, had become nearly complete by the end of the nineteenth century and had rendered possible the supply of coal for power from the coal-fields of Bengal and Bihar to run the machinery in the cotton mills to be established in the cotton belt. With regard to foreign competition, the mills in the interior could also enjoy at least partial protection in their local markets to the extent of saving the railway freight from the ports to the internal markets.

The main region of the cotton belt extends from Kathiawar and Gujarat in the Bombay province (where it reaches the sea-coast) to Central India, the Central Province and Hyderabad State. The earliest development of the cotton mill industry, outside the city of Bombay, took place at Ahmedabad, where the financial facilities and the entrepreneurial ability were in no way inferior to those at Bombay and where the mills, unlike at

¹² Report of the Indian Tariff Board (1927), Vol. I, pp. 119-29.

Bombay, were situated in the midst of the cotton growing districts of Gujarat and Kathiawar. The city of Ahmedabad was not far from the sea and the machinery and mill stores could be obtained through the Gujarat ports. The spinners and weavers required for the industry were drawn from a class of people whose forefathers carried on hand spinning and weaving before machinery came into use. 'The finished product could be conveniently distributed in Gujarat, Kathiawar, the U.P., Punjab and C.P.'¹³ In equally favourable conditions, the cotton industry reached certain other centres like Sholapur, situated in the cotton belt in the presidency of Bombay. Besides the advantages of local supplies in raw materials, cheap labour, and regional consumers' markets, common to all parts of the cotton belt, its area lying in the Central Province possessed an additional advantage in the existence of workable coal mines in that province. Mr J. N. Tata, who was the first industrialist to take the cotton mill industry outside the province of Bombay, realized the importance of this region and decided to locate his mills at Nagpur. 'The town was situated in a cotton growing district; it was the terminus of the G. I. P. Railway; it was within reach of supplies of coal from Warora mines and it was the chief market for many miles around.'¹⁴ It was also the centre of a large hand-loom industry ready for the products of Mr Tata's spinning sheds. Land in Nagpur was cheap, agricultural produce abundant and the distribution of the manufactures could easily be facilitated, owing to the central position of the town and the gradual growth of the converging railways.¹⁵ Local labour, though unacquainted with factory organization, was also very cheap,

Conditions, practically similar to those obtainable in the C. P., also existed in Central India, Hyderabad State and the remaining two important regions of the peninsular cotton belt—the one comprising the Southern Maratha country, Northern Mysore, North-Western districts of Madras, and the southern part of the Hyderabad State, and the other, consisting of the districts of the province of Madras situated to the south of the Mysore State. Naturally cotton mills came to be established in most of these areas. But the development of the industry to the south of

13 Report of the Indian Tariff Board (1927), Vol. II, p. 390.

14 Now it is not only a consuming centre but a big distributing centre for Bengal, Bihar and Orissa, besides the C.P.

15 F. R. Harris: *J. N. Tata, a Chronicle of his Life*, p. 27.

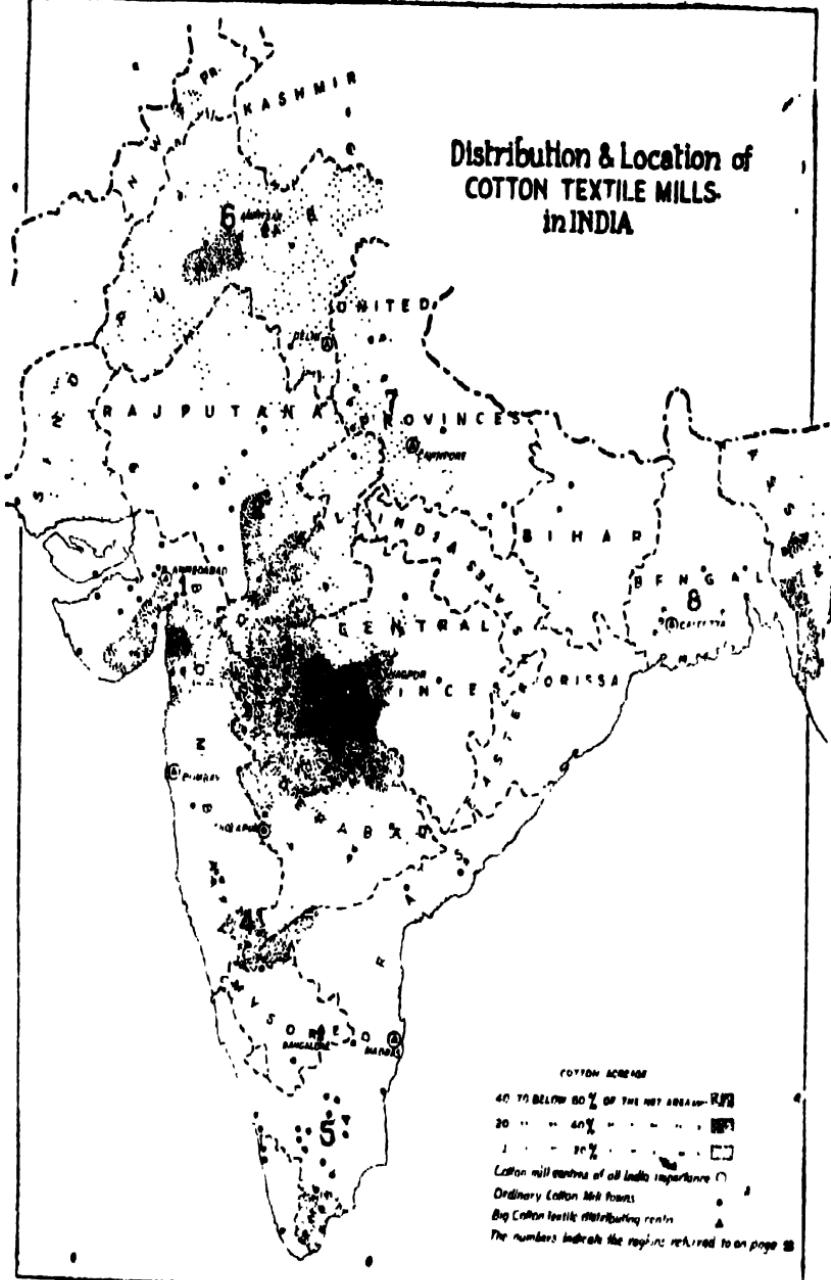
Sholapur remained greatly handicapped for want of coal, till the advent of hydro-electricity in Mysore and Madras. This was mainly responsible for the extraordinary increase in the number of mills in the Madras presidency during the last twenty years.

The first important up-country centre to attract the cotton mill industry outside the peninsular cotton belt was Cawnpore. It was situated on the edge of the main cotton growing region of the Indo-Gangetic plain which should really be regarded as a northward extension of the peninsular cotton belt, separated from the main belt by the intervening desert or semi-desert areas, rather than an independent sub-tropical cotton belt. Owing to its favourable geographical situation, large quantities of cotton passed through Cawnpore and on account of its being an important trading centre it possessed excellent financial facilities, while cheap labour was provided by the thickly populated areas in the neighbourhood. It was also one of the four biggest cotton textile distributing centres of Northern India—the remaining three being Amritsar, Delhi and Calcutta. Moreover, it was very favourably located for obtaining the supplies of good coal from the coal-fields of Bengal.

Delhi on the borders of the U. P. and the Punjab, though at a disadvantage in comparison with Cawnpore with regard to the supplies of coal, was much better situated from the point of view of raw materials. Other things being similar, it succeeded in attracting the cotton mills. But the most important part of this cotton region, lying beyond Delhi in the province of the Punjab, could not develop a cotton industry commensurate with its resources in raw materials and its wide markets, extending even beyond the borders of India. Probably the main factor responsible for this fact is the lack of coal or any other equally good source of motive power in this province.

The province of Bengal, along with Assam and parts of the province of Bihar, is the only region in the whole of India which lies farthest from the main cotton growing areas of the country. But on account of the favourable situation of the port of Calcutta for importing raw cotton, mill stores and machinery and the nature and extent of the markets along with the supplies of good coal within the province itself, it was found practicable to establish cotton mills in Bengal. As explained earlier in this chapter, the development of cotton industry in Bengal was long delayed for want of indigenous capital and enterprise.

Distribution & Location of COTTON TEXTILE MILLS. in INDIA



Thus, as a result of the decentralization movement which began in the last decade of the last century, the cotton mills had reached a large number of important towns throughout the cotton belt: from the Punjab to the province of Madras as well as in Bengal, by the time of the European War of 1914-18. From 1920 onwards the economic forces responsible for the dispersal continued to make a steady progress. The increasing network of railways and roads was opening up fresh markets in the interior of the country and the development of modern trade and commerce was bringing into existence financial facilities and financial institutions even in comparatively smaller towns of the interior. The Marwaris and other businessmen who carried on indigenous banking and trading operations in these towns were becoming familiar with the methods of modern finance and industrial organization and were taking up the entrepreneurial functions. As a result of these circumstances favouring further decentralization, the cotton industry became the most widespread of all the industries of the country. Cotton mills found their way into the cotton belt even to such small and remote towns as are not located in most of the ordinary maps not drawn on a large scale. This movement brought the cotton mills to rural surroundings, where the land could be had practically for nothing in comparison with centres like Bombay or Ahmedabad, and where the agricultural produce and other necessities of life and consequently labour were extremely cheap.

Between 1921 and 1937 the total number of mills rose from 280 to 419 and although they were scattered in nearly 117 cities and towns throughout India a majority of them are concentrated in the following eight well defined regions: (1) Gujarat and Kathiawar, (2) Malwa Plateau, (3) Khandesh and Berar (Tapti and Purna Valleys), (4) Bombay Deccan (between the Bhima and the Hagari rivers), (5) Southern Madras, (6) the Punjab Plains (between the Sutlej and the Chenab), (7) the Upper Ganges Valley (between Delhi and Cawnpore), and (8) Bengal (between Dacca and Calcutta). TABLE I overleaf shows the regional distribution and the locational trends during this period.

A comparison of the two sets of figures shows that the progress of the industry during the period under review has not been uniform in all the regions of the country. The increase in the number of mills in Western India and the C. R., the regions which attracted the industry earlier, has been very slow and their

TABLE I

| Region (Provinces and States) | 1921 | | 1937 | | Percentage of all India number | Percentage of all India number |
|---------------------------------|---------|--------------|---------|--------------|--------------------------------|--------------------------------|
| | Details | No. of mills | Details | No. of mills | | |
| Western India— | | | | | | |
| Bombay Island | 81 | • | | 73 | | |
| Suburbs of Bombay | 68 | | | 5 | | |
| Ahmedabad | 7 | | | 90 | | |
| Sholapur | 26 | 182 | 650 | 11 | 205 | 48.9 |
| Rest of Bombay Province | 4 | 14 | 14 | 14 | 14 | 3.4 |
| Bombay and Western India States | 5 | 18 | 18 | 16 | 16 | 3.8 |
| Baroda | 1 | 0.4 | 68.6 | 1 | 0.2 | 0.2 |
| Sind | | | | | | 56.3 |
| Rajputana and C. I.— | | | | | | |
| Ajmer | 2 | 0.7 | | 2 | | 1.0 |
| Rajputana | — | — | | 1 | | 0.2 |
| C. I. | 6 | 2.1 | 2.8 | 14 | 3.4 | 4.6 |
| C. P. and Hyderabad— | | | | | | |
| Nagpur | 4 | 5.0 | | 7 | | |
| Rest of C. P. | 10 | 14 | 1.1 | 12 | 19 | 4.5 |
| Hyderabad | 3 | 3 | 6.1 | 6 | 6 | 1.4 |
| Southern India— | | | | | | 5.9 |
| Coimbatore | 2 | | | 26 | | |
| Madura | 3 | 1.1 | 1.1 | 6 | | |
| Madras | 11 | 19 | 6.8 | 12 | 46 | 11.0 |
| Rest of Madras Province | 1 | 0.4 | 2 | 2 | 2 | 0.5 |
| Madras States | 2 | 0.7 | 9.3 | 3 | 23 | 5.5 |
| Mysore State | 4 | 1.4 | | 3 | 0.7 | 0.7 |
| Fr. Settlements | | | | | | 177 |
| Northern India— | | | | | | |
| Punjab | 4 | 1.4 | | 10 | | 2.4 |
| Delhi | 3 | | | 5 | | 1.2 |
| Cawnpore | 6 | | | | | |
| Rest of the U. P. | 12 | 18 | 6.4 | 13 | 23 | 5.5 |
| Bihar | — | — | — | 10 | 1 | 0.2 |
| Bengal | 12 | 4.3 | 13.2 | 26 | 62 | 15.5 |
| | | | | 419 | | |
| | | | | 280 | 1000 | |

respective shares in the all-India total have declined from 68.6 and 5 per cent to 56.3 and 4.5 per cent. Similarly from amongst the big centres of all-India importance, it is only the city and island of Bombay which recorded a decline in the number of mills from 81 to 78. On the contrary, the increase in the number of mills in the Coimbatore District of Madras, in the province of Bengal, and in most of the Indian States, has been very rapid. The progress in the remaining regions and centres has been fairly good.

But owing to the differences in the size of individual units, a study of mere numbers does not carry us far. For a proper appreciation of the regional distribution of the industry a comparison of the employment of labour in the cotton mills in different regions will prove more helpful. The average number of workers employed daily in 1921 and 1937 is given in TABLE II overleaf.

A study of this table confirms the results obtained by the analysis of the numerical distribution of the mills. The progress in the presidency of Bombay and the C. P. has been slow and in spite of a small increase in the average number of workers employed, the relative shares of these provinces in the total employment figure of the country have declined from 69.8 and 4.9 per cent to 53.0 and 3.7 per cent respectively. But in Baroda State, in the province of Delhi, and in the Coimbatore District of Madras, the industry has made a very rapid progress, which has been closely followed by the development in the States of Bombay and Western India Agency, Central India, Mysore and Hyderabad. The progress shown by the Madura District of Madras and the province of Bengal has also been fairly good. From amongst the big centres of the cotton industry the progress made by Cawnpore and Ahmedabad has been most spectacular. The Bombay city and island, in spite of a fall in the number of mills from 81 to 78, appears to have maintained its position so far as the employment of labour is concerned. The number of mills in 1937 in Bombay and Ahmedabad being 78 and 90 respectively, gives an impression as if the position of Bombay as the biggest cotton textile centre of India has been surpassed by Ahmedabad but the number of workers employed at Bombay, being nearly one and half times as much as at Ahmedabad, shows that up to this time the position of Bombay city as the 'Cottonopolis' of India remains unchallenged.

TABLE II
Average number of workers employed daily

| Region (Provinces and States) | 1921 | | | 1937 | | | Percentage of all-India Total |
|----------------------------------|----------|----------|----------------------------------|----------|----------|------|----------------------------------|
| | Details | Total | Percentage of All-India Total | Details | Total | | |
| Western India— | | | | | | | |
| Bombay Island and Suburbs | 1,45,290 | | | 1,47,356 | | | |
| Ahmedabad | 54,428 | | | 5,199 | | | |
| Sholapur | 18,555 | | | 1,06,586 | | | |
| Rest of Bombay Province | 23,263 | 2,41,536 | 69.8 | 19,714 | 3,01,828 | 53.0 | |
| Bombay and Western India States | | 1,668 | 0.5 | 22,973 | 8,511 | 1.5 | |
| Baroda | 2,330 | 0.7 | | 19,730 | 3,546 | 3.5 | |
| Sind | 70 | — | 71.0 | | — | | 58.0 |
| Rajputana and C. I.— | | | | | | | |
| Ajmer | 1,394 | 0.4 | | 4,004 | | 0.7 | |
| Rajputana | 7,662 | 2.3 | | 1,250 | | 0.2 | |
| C. I. | | | 2.7 | | 34,870 | 6.2 | |
| C. P. and Hyderabad— | | | | | | | |
| Nagpur | 6,637 | | | 9,872 | | | |
| Rest of C. P. | 10,574 | 17,211 | 4.9 | 11,125 | 20,997 | 3.7 | |
| Hyderabad | 3,044 | 0.9 | 5.8 | 7,751 | 1.4 | 5.1 | |
| Southern India— | | | | | | | |
| Coimbatore | 3,780 | | | 23,711 | | | |
| Madura | 4,776 | | | 14,458 | | | |
| Madras | 10,010 | | | 10,910 | | | |
| Rest of Madras | 6,758 | 25,324 | 7.3 | 14,632 | 63,711 | 11.3 | |
| Madras States | 243 | — | | | 1,936 | 0.4 | |
| Mysore | 4,849 | 1.4 | | | 13,658 | 2.5 | |
| Fr. Settlements | 5,887 | 1.7 | 10.4 | | 5,537 | 1.0 | |
| Northern India— | | | | | | | |
| Punjab | 1,430 | 0.4 | | 4,390 | | 0.8 | |
| Delhi | 1,343 | 0.4 | | 9,845 | | 1.7 | |
| Cawnpore | 12,802 | | | 34,618 | | | |
| Rest of U. P. | 5,732 | 18,534 | 5.5 | 6,568 | 41,186 | 7.3 | |
| Bihar | — | — | | | 327 | | |
| Bengal | 12,838 | 3.8 | 10.1 | | 27,484 | 4.8 | |
| | | | | 1000 | | | 14.6 |
| | | | | | 567,361 | | 100.0 |
| | | 3,45,363 | | | | | |

The extraordinarily rapid progress of the cotton industry in Southern India, especially in the Coimbatore District of Madras and Mysore State, and other Indian States needs some explanation. As mentioned previously the cotton industry to the south of Sholapur was handicapped for want of coal. But the development of hydro-electric power in Madras (particularly the Pykara scheme in the Coimbatore District) and Mysore State gave a great fillip to the industry in these parts and the number of mills in the Coimbatore District and the Mysore State rose from 3 and 2 in 1921 to 26 and 23 in 1937 and the average number of workers employed daily increased from 3,780 and 4,849 in 1921 to 23,711 and 13,658 in 1937 respectively.

The reasons for the phenomenal progress of the industry in the Indian States deserve to be briefly enumerated. The governments of the States in their anxiety to attract the industry within their own boundaries offered various concessions to the mill companies in the form of cheap or free land and the remission of taxes. The rules and regulations formed under the factory acts were kept very liberal and in some of the States (noteworthy examples being the Nizam's territory and Indore) export duties on cotton and import duties on piece-goods were imposed to attract the cotton mills.¹⁶

Now the cotton mills have reached almost all those parts of India where the production of raw cotton is of some importance and new mills are still being started in the interior districts of Madras, Bengal, the U. P. and the Punjab, where the tempo of the progress of the industry is yet on the increase. In Western India and the C. P. where it came earlier the pace of progress has become comparatively slow and in the city of Bombay where it came earliest it has become almost stationary.

The feature of early concentration of the cotton industry on the western sea-coast and its subsequent dispersal in the cotton growing regions of the interior of India is in no way peculiar to this country alone. Such a thing is bound to happen in the case of new countries like the United States of America or the industrially young countries like India and China. The development and growth of the cotton industry in the United States of America bears a close resemblance to that of India. The textile industry first established itself in the New England States on the north-eastern coast of North America facing the continent of Europe,

¹⁶ Report of the Indian Tariff Board (1927), Vol. II, p. 134.

but later on when the rich plains of the interior were opened up, the industry moved in the cotton belt to the Southern States of North and South Carolinas, Georgia, Alabama and Tennessee. In the years previous to the Civil War, New England led both in the number of spindles and in the amount of cotton consumed. But from that time onward, there was a steady increase in the strength of the industry in the Southern States, with the result that in recent years these States have easily led both in spindles, and the number of bales consumed.¹⁷

Incidentally it will also be interesting to compare the present regional distribution of the cotton industry in India with that in the seventeenth and eighteenth centuries.¹⁸ At that time the industry was located in three well defined regions: (1) In Northern India in the plains of the rivers Indus and Ganges the manufacture of cotton textiles was carried on in a large number of towns from the Punjab to the head of the Bay of Bengal. But the goods manufactured in the areas extending from Amritsar and Lahore up to Agra and Seronj converged on the port of Surat in Western India through Ahmedabad and the goods from the rest of the Ganges valley moved to the ports of Bengal. The most prominent seat of the industry, however, was at Dacca. (2) In Western India the industry was localized in Gujarat, Khandesh, parts of the present C.P. and C.I., at Ahmedabad, Surat, Broach, Burhanpur and Ahmednagar. The goods found an outlet through the ports of Surat and Cambay. (3) In Southern India the manufacture of cotton fabrics was carried on in a large number of towns situated mostly on the Coromandal coast from Vizagapatam to Tuticorin, the most important centre being Masulipatam.

The present distribution of the cotton industry shows a very close resemblance to the old. Western India and the C.P. have again come to be the most important cotton textile producing region, but the emphasis from Surat, Broach and Burhanpur has now shifted to Bombay, Ahmedabad and Nagpur. Southern India is also showing signs of regaining its old importance, but the centres of production have shifted from the coastal region

¹⁷ Appendix VII to the Report of the Indian Tariff Board, 1927, Vol. I, contains a very interesting extract from the *Economist* entitled 'The Plight of New England's Textile Industry'. It shows how similar the problems of the cotton industry of the U. S. A. are to those of the Indian industry.

¹⁸ See the map facing page 184 of R. K. Mukerjee's *Economic History of India, 1600-1800*.

DISTRIBUTION OF
TEXTILE INDUSTRY
IN SEVENTEENTH AND
EIGHTEENTH CENTURIES



around Masulipatam to the Southern Maratha country and the districts of Coimbatore, Madura and Tinnevelly. In the plains of the Indus and the Ganges, the manufacture of cotton textiles has been started in quite a large number of towns. But the place of Lahore, Agra, Lucknow, Benares, Patna, and Dacca, as important centres of production in the seventeenth and eighteenth centuries is occupied today by Amritsar, Delhi, Cawnpore, and Calcutta. The productive capacity of this region is yet small in comparison with its resources and the extent of demand, and the economic forces have yet to assert themselves to restore this region to any thing like its former glory.

In spite of the similarity of the regional distribution of the industry in the seventeenth and eighteenth centuries, on the one hand, and at the present time, on the other, there are important locational differences inside the regions themselves. These differences have been brought about by the changes in the character of markets, and the transport relations. During the seventeenth and eighteenth centuries the export trade in textiles was very important and, therefore, the manufacture of the cotton fabrics was attracted towards the towns situated near the sea-coast in the vicinity of good ports; and the important textile centres of Gujarat, the Coromandal coast and Bengal were located near or on the sea-coast. Goods from Lahore, Delhi and Agra were taken to Surat and Ahmedabad in wagons and on pack animals, but beyond Agra up to the Bay of Bengal the river Ganges along with its tributaries was the main highway. Burhanpur was a great central mart between Malwa and the Deccan, and Benares and Patna were the important cloth marts of Eastern India. Surat, Hooghly, Dacca, Kassimbazar, Pipli, Balasore and Masulipatam were the important cloth ports.

But now the goods are mostly manufactured for the internal markets and therefore the important manufacturing centres like Ahmedabad, Coimbatore, Nagpur, Sholapur, and Cawnpore are located in the interior. Owing to the changes in the harbour facilities, the centre of gravity has shifted from Surat, Masulipatam, Pipli and Hooghly to Bombay, Madras and Calcutta. In the same way the change from river to rail transport has led to the decay of some of the centres like Agra or Benares and some of the central marts like Burhanpur have been by-passed by the main railway lines, while other comparatively unimportant places like Cawnpore and Nagpur have been brought into prominence.

CHAPTER III

POSSIBLE REDISTRIBUTION OF COTTON INDUSTRY IN THE COTTON BELTS

In the previous chapter the various economic factors governing the location and distribution of cotton industry in the various regions of India have been discussed. It has been pointed out that the industry is no longer confined to the city of Bombay or even Western India but has reached almost all parts of the country. But in spite of this scatter-up, the concentration in certain regions or localities is very heavy, while in other regions and localities the industry is incapable of coping with the consumers' demand for cotton textiles in those areas or localities. In response to this demand the cloth from surplus regions moves to the deficit regions and India being a country of vast distances depending on railway transport alone in most of the regions of the interior, the cost of cloth increases considerably. Therefore, in order to relieve the consumers of the unnecessary transport costs, it is essential that after careful investigation of economic possibilities the dispersion of the industry should be encouraged to the fullest extent in the post-war period.

In order to be in a position to advise a redistribution of the industry a detailed examination of production as well as demand in different regions along with their local resources is of utmost importance. The decentralization of cotton industry that took place during the two decades from 1920 onwards also brought about considerable changes in the volume of production of cotton textiles in different regions of India. At the end of the war of 1914-18 the province of Bombay alone produced practically four-fifths of the entire cotton goods manufactured in the whole of India. But during the inter-war period that position has undergone material changes and today the province of Bombay may not be responsible for the production of a little more than half the entire output of the Indian cotton industry. The production figures for the years 1921-22 and 1938-39 given in TABLE 411 overleaf show the changes in the provincial output.

The statistics for the different Indian states are not given separately and, therefore, a regional grouping of the provinces and states is not possible. But even then these figures help us

TABLE III

| Province | Production of yarn (000 lbs.) | | | Production of woven goods (000 lbs.) | | |
|-----------------------------------|-------------------------------|-------------------------------|-----------|--------------------------------------|----------|-------------------------------|
| | 1921-22 | Percentage of all-India total | 1938-39 | Percentage of all-India total | 1921-22 | Percentage of all-India total |
| Bombay | 4,92,634 | 71·0 | 6,47,663 | 49·7 | 3,26,615 | 80·9 |
| Ajmer | 2,544 | 0·4 | 15,140 | 1·2 | 1,944 | 0·5 |
| C. P. | 32,818 | 4·6 | 59,599 | 4·6 | 16,406 | 4·1 |
| Madras | 44,388 | 6·3 | 1,68,800 | 13·0 | 11,131 | 2·8 |
| Punjab | 3,564 | 0·6 | 15,727 | 1·2 | 128 | — |
| Delhi | 2,960 | 0·4 | 30,889 | 2·3 | 1,189 | 0·2 |
| U. P. | 40,477 | 5·9 | 1,17,704 | 9·0 | 11,895 | 3·0 |
| Bihar | — | — | 2,813 | 0·2 | — | 466 |
| Bengal States & Foreign territory | 33,636 | 4·9 | 45,695 | 3·5 | 4,061 | 1·2 |
| | 40,561 | 5·9 | 1,99,216 | 15·3 | 29,302 | 7·3 |
| Total | 6,93,582 | 100·0 | 13,03,246 | 100·0 | 4,03,271 | 100·0 |
| | | | | | 9,20,475 | 100·0 |

to arrive at important conclusions. The relative share of the province of Bombay in the all-India production of yarn and woven goods has declined from 71 and 80·9 per cent to 49·7 and 59·8 per cent respectively. The share of Bengal in the all-India production of yarn and the shares of the C. P. and Madras in the all-India production of woven goods have also shown slight decrease. With these exceptions the proportionate shares of all the remaining provinces and states of India have shown considerable progress. Out of the major producing areas, the production of yarn has trebled in the U. P. and quadrupled in Madras and in the case of the Indian states it has risen five times; the production of woven goods has increased more than five times in the U.P. and the Indian states and more than nine times in Bengal.

The abnormal differences in development of spinning and weaving in Madras need some explanation. In this province the hand-loom section of the cotton industry has always been very important. Generally, reliable figures about the hand-loom industry are not available, but according to the estimates¹ placed before the Tariff Board (1927), the province of Madras alone

¹ Report of the Indian Tariff Board, 1927 (Cotton Textile Industry Enquiry), Vol. III, p. 1.

accounted for nearly one-third of the total yarn consumed in 1924-25 by all the hand-looms in India. Subsequently when the development of comparatively cheap supplies of hydel energy facilitated the establishment of new mills in close proximity to the cotton growing areas,² many of them took to spinning only to provide yarn to the local hand-loom industry and thus the increase in the production of woven goods has not been proportionate to the increase in the production of yarn.

In spite of so much increase in the production of cotton textiles in other provinces the province of Bombay alone still provides 60 per cent of the total production of the whole of the country, while the production in the Indo-Gangetic plain is not more than 16 per cent of the total. We may now proceed to examine as to how far the present distribution of the productive power is correlated to regional demand for cloth.

The assessment of regional demand for Indian mill cloth is rather a difficult task in so far as the demand for such cloth is not uniform throughout the whole of India. Per capita consumption of imported cloth may be greater in urban areas than in rural areas, where a fair proportion of cloth requirements may be met by hand-loom products. The proportion of urban population varies from province to province, ranging from 2.7 per cent in Assam to 26.0 per cent in Bombay. In the province of Assam where the urban population is so insignificant, practically every rural home possesses a loom of its own to produce at least a part of its own requirements and practically every housewife knows the art of spinning and weaving. The consumption of mill cloth in such regions will naturally be much less than the average. In the provinces of Madras, Punjab, Bengal, U. P., C. P., Bihar and Orissa the hand-loom industry is of considerable importance and may be responsible for satisfying a fair share of the local demand. But in spite of these difficulties it is possible to have some rough estimates of regional demand to serve our purpose.

The pre-war normal total demand for all types of cotton textiles for the whole of India could be placed between 62,000 and 64,000 lakh yards, of which from 42,000 to 44,000 lakh yards were provided by the Indian mills and nearly 6,000 to 7,000 lakh yards were imported. The remaining 13,000 or 14,000 lakh yards were

² Report of the Special Tariff Board, 1936 (Cotton Textile Industry), p. 15.

supposed to be the contribution of the hand-loom industry.³ Thus the Indian mill industry provided nearly 68 per cent of the total demand. The distribution of the Indian mill-made cloth in different regions of India, along with regional production may be estimated as follows:

• TABLE IV

| Region | Areas included | Estimated consumption of Indian mill cloth in lakh yards, on the basis of the distribution of population in 1941 | Percentage of all-India consumption | Production of Indian mill cloth in lakh yards in 1941-42 | Percentage of all-India production |
|-------------------|---|---|-------------------------------------|--|------------------------------------|
| Western India | Provinces of Bombay, Sind & Baluchistan, Western India Agency, Baroda & all other States in these provinces | 4,080 | 9.7 | 30,870 | 68.8 |
| Rajputana & C. I. | Ajmer, Gwalior & C. I. Rajputana & C.I. | 3,480 | 8.3 | 3,100 | 6.9 |
| C. P. & Hyderabad | | 3,530 | 8.3 | 1,580 | 3.5 |
| Southern India | Provinces of Madras & Coorg & the States of Cochin, Travancore, Mysore & others | 5,240 | 12.3 | 2,820 | 6.2 |
| Northern India | Provinces & States of N.W. F.P. Kashmir Punjab Delhi U. P. Bihar Orissa Bengal Sikkim Assam | 740 520 } 4,560 3,300 130 6,710 4,690 1,220 7,405 15 } 8,730 1,220 26,040 42,370 | 61.4 100.0 | 600 850 2,630 150 1,940 6,560 44,930 | 14.6 100.0 |

³ The Tariff Board (1927) estimated the hand-loom production at 13,720 lakh yards (Vol. I, p. 156), while the Special Tariff Board (1936) estimated this production at 14,260 lakh yards. (Report, p. 101)

A comparison of the estimates of production and consumption in the various regions of India shows that the production in Western and Northern India is very much disproportionate to demand in these regions. The production in Western India is far in excess of the normal demand while the cloth manufactured in Northern India is only a small fraction of the requirements of that region. The remaining three regions are also deficit areas although the extent of deficiency in case of Rajputana and C. I. is comparatively much less. If C. I. alone, apart from

TABLE V

International trade in cotton piece-goods (000 mds.)

(Average for three years, 1937-38 to 1939-40)

| Area | Imports | Exports | Net imports | Net exports |
|---|--------------------|---------|------------------|-------------|
| Western India— | | | | |
| Bombay Province (except Bombay Port) | 395 | 3,047 | | 2,652 |
| Bombay Port | 547 | 2,839 | | 2,292 |
| Sind and Baluchistan (except the Port of Karachi) | 479 | 39 | 440 ^P | |
| Port of Karachi | 41 | 705 | | 664 |
| Rajputana and C. I.— | | | | |
| Rajputana | 368 | 44 | 324 | |
| C. I. | 169 | 648 | | 479 |
| C. P. and Hyderabad— | | | | |
| C. P. | 374 | 182 | 192 | |
| Hyderabad | 168 | 43 | 125 | |
| Southern India— | | | | |
| Madras Province (except Ports) | 497 | 313 | 184 | |
| Chief Madras Port | 221 | 253 | | 32 |
| Other Madras Ports | 176 | 67 | 109 | |
| Mysore State | 146 | 106 | 40 | |
| Northern India— | | | | |
| Kashmir State | 54 | 1 | 53 | |
| N. W. F. P. | 281 | 3 | 278 | |
| Punjab | 1,372 | 148 | 1,224 | |
| Delhi | 569 | 447 | 122 | |
| U. P. | 1,414 | 352 | 1,062 | |
| Bihar | 1,125 ^P | 77 | 1,048 | |
| Orissa | 140 | 2 | 138 | |
| Bengal Province (except Calcutta Port) | 946 | 116 | 830 | |
| Calcutta Port | 1,442 | 1,708 | | 266 |
| Assam | 266 | 1 | 265 | |

Rajputana, is taken into account, probably it would be found to be a surplus region.

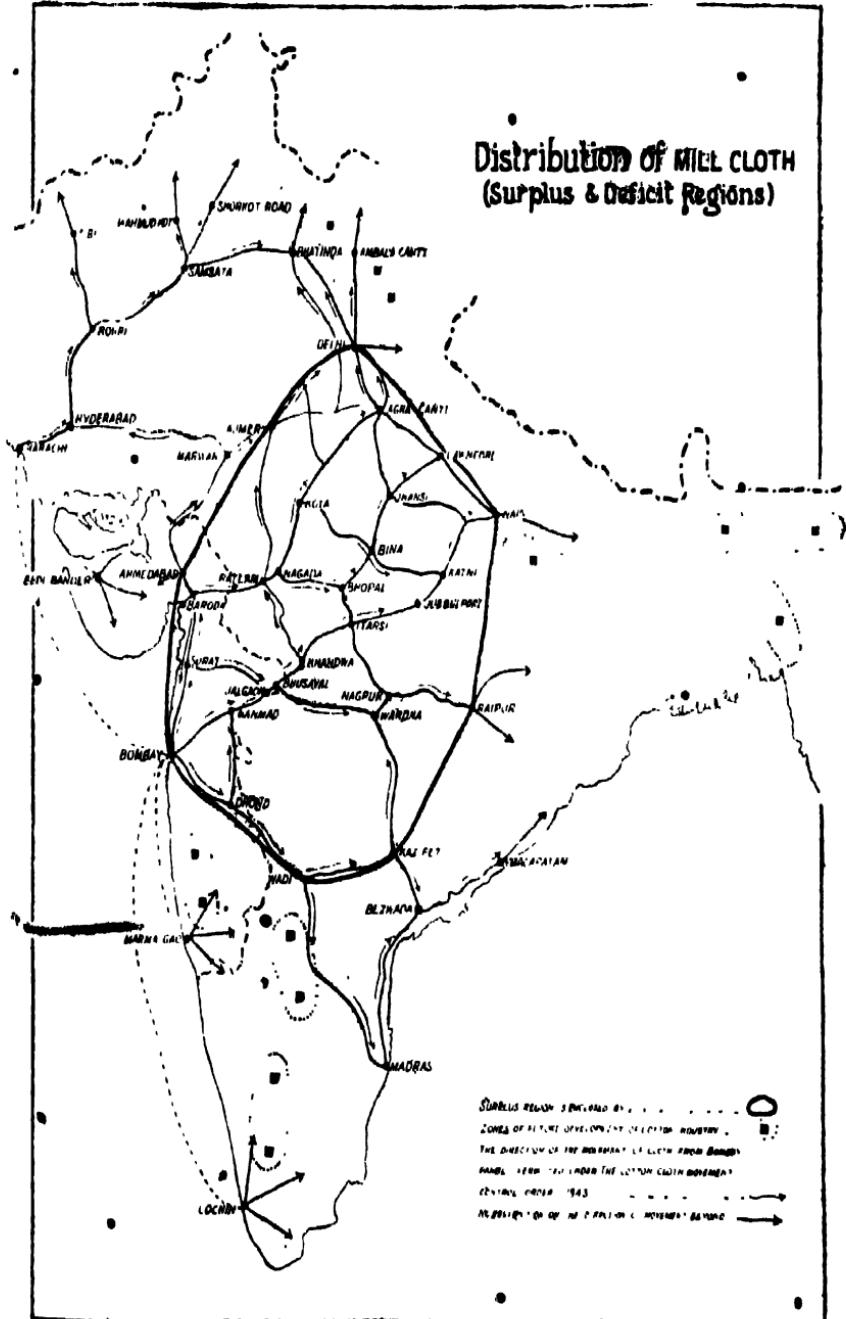
In these circumstances, the vast stocks of surplus cloth available in Western India naturally flow to other regions to make up the deficiency there. In consequence the traffic in cloth between Western India and the Northern plains is extraordinarily heavy, involving huge railway hauls over long distances. This state of affairs results not only in considerable additions to the price to be paid by the consumers in normal times but also leads to virtual cloth famine in abnormal times, like a war, in distant provinces like the U. P. and Bengal.

The extent of internal transport required to distribute the cloth from surplus regions in deficit regions may be judged from TABLE V on p. 39.

The figures given in this table include all kinds of piece-goods, foreign as well as Indian, and mill cloth as well as hand-loom products, while the estimates given in the previous table relate only to the manufactures of Indian mills. But the figures given in both the tables lead to the same conclusions. Leaving the ports of Karachi, Madras and Calcutta aside, Central India is the only area, besides Bombay presidency, where the exports are in excess of the imports. The surplus in this case being of little importance, Bombay is the only province where a huge surplus is available for export. Of the deficit areas, the net imports of the Punjab, the U. P. and Bihar each exceed a million maunds per annum, and if the provinces of Bengal and Assam were taken together, the net imports in their case also will rank the neighbourhood of the net imports of the Punjab. A very notable feature of the distribution of productive power and consumption in different regions is that the areas where the differences in production and consumption are the least are nearest to the centres of production in Western India, while the areas, where such differences are greatest, are farthest from these centres. Thus the deficiencies in Rajputana, the C. P. and Hyderabad, and Southern India can be easily made up by the supplies obtained from Western India, but with regard to Northern India where the distances of railway transport involved for certain Northern and Eastern areas are much greater, the position is far from being satisfactory.

According to the provisions of the Cotton Cloth Movement Control Order (1943), the whole of India has been divided into

Distribution of Mill Cloth (Surplus & Deficit Regions)



Surplus areas and Deficit zones. There are only two Surplus areas in the whole of the country—the Bombay Surplus Area and the Delhi Surplus Area, while the remaining nine—(1) Sind, (2) the Punjab, (3) Rajputana, (4) the U. P., (5) the C. P., (6) Bihar, (7) Bengal, (8) Orissa, and (9) the South—are all Deficit zones. The Division of India into these areas and zones is based on considerations of administrative convenience. But even these divisions point in the same direction. The province of Delhi has been defined as a surplus area only on account of the small area of the province, otherwise when considered along with other neighbouring areas of the surrounding region it will not show any surplus production. Thus the province of Bombay is the only surplus area in the whole of India and the remaining regions are all deficit zones.

None of these descriptions and statistical tables given so far, however, make the position absolutely clear. But only a casual glance at the map of India indicating the direction of the movement of cotton cloth from Bombay Panel, permitted under the Cotton Cloth Movement Control Order (1943), will show that the only surplus region of India is the one which can be enclosed by a line drawn through the towns of Bombay, Wadi, Kazipet, Raipur, Naini, Cawnpore, Delhi, Ajmer, and Ahmedabad. Most of the regions lying outside this area form deficit zones, and from the point of view of demand there is yet ample room for further expansion of the cotton industry in most of them and, therefore, wherever the economic resources of the deficit regions justify, an increase in their present productive capacity ~~should~~ be brought about by further strengthening the forces responsible for the dispersal of cotton industry. Dr R. Balkrishna, in his pamphlet, *Finance and Structure of Industry*, writes: 'During the post-war period it is necessary to encourage this scatter-up after an official investigation of the power potentialities of each region and the extent of demand in those areas. Such a measure is an economic necessity as the dependence on a concentrated cotton industry would involve the consumers in unnecessary transport costs.'

The consumers' demand in Northern India is generally supplied through the four great cloth markets situated at Amritsar, Delhi, Cawnpore and Calcutta—the four great distributing centres of all-India importance. Bombay, Ahmedabad, Sholapur, Nagpur, and Madras—the main cotton textile producing centres

of all-India importance—all look to these markets for the absorption of a fair proportion of their goods.⁴

Cawnpore, out of these four great cotton cloth markets, has already come to be the most important seat of cotton industry in Northern India. Any considerable increase in the number of mills may not be expected in this centre, because the sudden and abnormal growth in the size of the city and its population has already resulted in the scarcity of the requirements of daily life like milk, fruits, vegetables and other articles of food. The land values and rents are also going up and a substantial increase in the cost of living is taking place, which might lead eventually to a rise in wages with the result that the local industry may be deprived of the advantage of cheap labour.

The industry at Cawnpore produces mostly coarse goods for the use of poorer classes of people living in the neighbouring areas. Nearly 96 per cent of the yarn spun in 1938-39 consisted of counts below 3ls. For these goods, besides Bengals grown in the U. P., the Punjab-American cottons are also used. The railway freight on the Punjab cottons from Lyallpur to Cawnpore is Re. 1 and 10 as. per maund, while Ahmedabad can place its cloth in the Cawnpore market by paying Re. 1 and 13 as. per maund.⁵ Thus the advantage of cheap raw materials is entirely lost to the Cawnpore industry when it uses the cotton grown in the Punjab. So, for want of suitable long-stapled cotton required for spinning finer counts and producing superior stuff, which alone can bear freight charges for longer distances, Cawnpore cannot take up the production of goods of better quality for distribution over an area wider than that already supplied. Thus there does not appear to be much scope for further growth of cotton mill industry at Cawnpore.

With regard to the supplies of raw materials of a superior type the mills at Delhi are much better placed. They use besides local cotton the Punjab-American (Lyallpur), Broach and Nagpur cottons. For securing the Punjab-American cotton, Delhi is at an advantage as compared to Cawnpore and consequently produces better quality goods. But in obtaining the supplies of coal from Jharia, Delhi stands at a disadvantage in comparison

⁴ Report of the Indian Tariff Board (1927), Vol. II, pp. 192, 194 and 479 and Vol. IV, p. 509.

⁵ Commercial Directory of U. P. (1941-42), p. 6.

with Cawnpore.⁶ The cotton manufacturing towns of Bhiwani (in Southern Punjab), Moradabad, Rampur, Aligarh, Hathras, Ujhiani (in Western U. P.) are all situated in the same region to which Delhi belongs and are in an advantageous position for securing raw cotton in comparison with the towns situated to the East of Cawnpore. If hydro-electric power at a price cheaper than coal becomes available the productive power of the cotton industry in this area might be increased considerably.

A little further to the north-west lies the main cotton belt of the Punjab which, besides Desi varieties, also produces a considerable quantity of the Punjab-American cotton. Amritsar, one of the four great North Indian distributing centres, is also situated in this area. The cloth market in this centre supplies not only the subsidiary markets at Gujranwala, Sialkot and Lyallpur in the Punjab but is also responsible for the distribution of cotton textiles in the North-West Frontier Province and Kashmir.⁷ Up to this time the area served by this centre provides one of the best markets for the goods of Ahmedabad and the mill industry in this centre and the surrounding region is the least developed of all the four North Indian distributing centres, in spite of the ample local supplies of raw materials of a very suitable type being available for the production of goods which can find a ready market in the neighbourhood. In mill production the area covered by the cotton belt in the province of the Punjab ranks lower even than the minor province of Delhi.

Probably the most important reason for this backwardness may be the lack of suitable sources of power but besides that there may be a number of other contributory causes. Before the advent of the canals vast areas of land in this province were lying uncultivated. Canal water brought new life to millions of acres of this land, and a rapid expansion of agriculture that followed brought the well-known canal colonies into existence, where the standard of living of the farmer is not much below that of the Central European farmer, and as yet the pressure of population on land is much less in comparison with other provinces. Consequently, the wages in the Punjab are higher than in any other province except Bombay. Secondly, the employment in the Indian army is a subsidiary occupation of a

⁶ Report of the Indian Tariff Board (1927), (Cotton Textile Industry Enquiry), Vol. IV, p. 576.

⁷ Report of the Indian Tariff Board (1927), Vol. III, pp. 415-16.

considerable section of the agricultural and rural population of the Punjab and the money received in the form of salaries and pensions of some of the members of such families in villages is a very important source of their income. Thus the advantage of cheap local labour obtainable in the cotton growing regions of other provinces is lacking in this region.

The recent development of hydro-electric power has given some impetus to the cotton manufacturing industry. Some cotton mills have been established at Lahore, Amritsar, Ludhiana, Lyallpur and Montgomery. But the nature of motive power has given more encouragement to small factories working power-looms with the help of electricity. Besides spinning and weaving factories, nine finishing plants have also been established at Amritsar. This is a novel feature of its kind and resembles the organization of the textile industry of Japan. The spinning side of the industry appears to be comparatively weak and if, after the development of hydro-electric power from the new schemes, the establishment of a regional grid becomes a possibility, a development of the cotton industry on the lines of the Madras industry may not be surprising. The area surrounding Amritsar in the Punjab is one of those two regions which are likely to become very important in the manufacture of mixtures of cotton, wool and silk and the production of art silk, rayon and staple fibre textiles. The second such area is Mysore, along with parts of Madras and Bombay provinces. But the scope for such development in this area may not be so great as it is in the Punjab. Before the war (1939) there were about half a dozen small factories at Amritsar which were engaged in producing rayon textiles. Art silk, staple fibre and mixtures were also being woven. Besides nine finishing plants, mentioned earlier, there are also two embroidery mills—probably the only two of their kind in the whole of India. The scope for further development of cotton industry in this region is very great not only for the production of coarse types of goods but also for finer materials as the Punjab-American cotton is available to the industry at its door. But the share of this progress that is likely to go to the mill industry cannot be ascertained with any degree of accuracy. It is just possible that a further development of hydro-electric power in the province may enable the light power-loom (with central preparatory system) to annex a major part of such development to itself.

From Delhi to Amritsar, Lahore and Lyallpur there is enough scope for the development of cotton mills for preparing not only coarse goods but also for spinning and weaving finer counts owing to the production of cotton with a longer fibre. But from Delhi to Cawnpore there is not much scope for the production of finer materials. The future development in this area may be shared between the self-contained mills and the purely spinning mills, each supporting a number of light power-loom factories.

The region represented by the last remaining distributing centre—Calcutta—does not comprise a cotton belt. Even then there is scope for further development of cotton industry in this region as Calcutta is probably the largest single cotton piece-goods market in the world.⁸ But the development in this region might follow slightly different lines from those likely to be followed by cotton industry in the cotton belts. The industry in this region will be mainly dependent for the supplies of its raw materials upon the cotton obtained from other provinces or from abroad, and therefore, the establishment of cotton mills in smaller towns of the interior may be difficult. Similarly, even after the development of electric power in Bengal, a considerable number of light power-loom factories also are not likely to come into existence as they will have to depend upon yarn obtained from outside the province. Purely spinning mills to provide yarn to such factories cannot be successful on account of inadequacy of local supplies of raw materials. Thus the circumstances appear to be favourable for the establishment of self-contained mills in important centres.

The first cotton mill (Bowrehah) was started in 1818 at Calcutta, but the attempts to establish the cotton industry in Bengal did not meet with appreciable success till the war of 1914-18. Dr Loka Nath thinks that 'the main reason why the cotton industry did not develop was probably the concentration of the jute industry.'⁹ But besides this a number of other causes responsible for this state of affairs might be found in the history of early British rule in Bengal. Reference has already been made in the previous chapter to the ruin of the cotton industry of Bengal and the disappearance of the local entrepreneurial class. The European entrepreneurs, who established themselves in Bengal found vast untapped resources awaiting exploitation in

⁸ *Indian Cotton Industry, (Eastern Group Pamphlet)*, p. 2.

⁹ P. S. Loka Nath: *Industrial Organization in India*, p. 63.

the spheres of jute, coal, tea, and transport industries. There was practically an unlimited field for the most remunerative employment of their financial resources in these industries. The development of railways, later on, diverted the movement of Northern and Central Indian cotton from Calcutta to the ports of Western India and deprived the province of Bengal of the necessary supplies of raw cotton. In the absence of local raw materials, the cotton industry did not attract the attention of the non-Indian industrialists.

The ruin of industries in Bengal was closely followed by the introduction of a purely literary type of education, which was the only one generally provided. The intellectual classes of Bengal freely availed themselves of this system of education, brought into existence by the East India Company, partly with a view to fitting them for subordinate jobs in its service. As a consequence of this, the upper classes of people neglected the industrial and commercial careers and grasped eagerly at the Government, professional and clerical employment.¹⁰

These factors militated against industrial development and the province failed to develop a local system of indigenous industrial finance similar to that of Bombay or Ahmedabad. The establishment of their monopoly in a number of important trades by the East India Company had displaced the Indian merchants. Some of them took up the functions of middle-men, but 'many persons belonging to trading and money-lending classes gave up trade and acquired large and small estates. The accumulated capital came to be invested more in land than in trade and industry.'¹¹

It was only as late as 1905 that the modern cotton industry of Bengal was established as a result of purely indigenous Bengalee enterprise during the Swadeshi Movement. At the present time 16 out of the 26 working mills are under Bengalee management and the Bengalees predominate as directors and managers of the cotton mills of Bengal. Indigenous capital structure is also being built up. More than a dozen scheduled banks and a good number of insurance companies are now controlled and managed by the Bengalees. This is a good sign for the future development of industries inasmuch as the Calcutta finance market as compared with that of Bombay has been dominated mainly by foreign financial interests.

¹⁰ Report of the Industrial Commission (1916-18), p. 65.

¹¹ R. K. Mukerjee: *The Economic History of India, 1600-1800*, p. 78.

In spite of drawbacks, the cotton industry of Bengal enjoys certain advantages. The distributing centre of Calcutta commands a very wide consumers' market not only in Bengal but also in Assam and the adjacent parts of the neighbouring provinces of Bihar and Orissa. The climate favours the wearing of cotton clothes even during winter in Calcutta and other places near the sea-cost. In respect of the supplies of coal for power, the industry in Bengal is the most favourably situated probably, in the whole of India. But for obtaining raw cotton it is at a disadvantage. Bengal mills obtain their cotton from the Punjab and Southern India. The use of the Punjab-American cotton means a very long railway haul, while the use of the Cambodia (from the Madras Province) means the payment of terminal charges twice, as this cotton comes first to Madras by rail and then to Calcutta by steamer.¹² And if it is to be used in the towns of the interior like Dacca or Kushtia, further river or rail transport charges have to be paid. As there are no facilities for obtaining supplies direct from outside countries practically no imported cotton is used.¹³ All the foreign varieties, with the exception of the Columbia, arrive at western ports and there are no fumigation facilities for treating American cotton in any other port (including Calcutta) except Bombay.

The difficulties in obtaining the necessary supplies of raw cotton are reflected in the stunted growth of the spinning side of the cotton industry of Bengal. A perusal of TABLE III (p. 36) would show that the growth of yarn production is less than proportionate to the increase in the manufacture of woven goods. It was pointed out to the Tariff Board (1927) that while the textile mills could earn some profit, however low, in manufacturing cloth, they sustained a clear loss in regard to spinning.¹⁴ The Special Tariff Board (1936), too, remarked that in Bengal there was a tendency for mills to concentrate largely on the manufacture of cloth to meet demands of the local markets.¹⁵

There are other difficulties with regard to labour and mill stores. The Bengal mills represented to the Tariff Board (1927) that they had to keep a larger number of spare hands than the Bombay mills were required to do, because there were only a few cotton mills there and if the men were absent they could

¹² Report of the Indian Tariff Board (1927), Vol. III, p. 342.

¹³ *Ibid.*, p. 349. ¹⁴ *Ibid.*, p. 327.

¹⁵ Report of the Special Tariff Board (1936), p. 15.

not get spare hands at once as in Bombay, and with regard to mill stores they were obliged to keep large stocks as the cotton mill stores were not available in the Calcutta market.¹⁶

The difficulties with regard to labour and mill stores are of a temporary nature and the disadvantages of freight on raw cotton can be offset against the savings in freight on coal. Finally, the existence of an extensive market for cotton goods—especially saris, dhoties and shirtings—acts as an incentive to the further growth of the industry and there is yet enough room for a substantial increase in the strength of the cotton industry in this province. But on account of the difficulties in obtaining the raw materials, the future of the cotton industry lies in providing better technical equipment and in creating more skilled labour force in order to enable it to produce superior and finer stuffs.

On the whole, the circumstances favour the growth of the cotton industry in the interior parts of most of the cotton belts as well as in the province of Bengal, and it appears likely that the productive capacity of all these regions will go on increasing with further additions in the number of mills in these areas. But assuming that the existing demand for cotton goods does not increase appreciably, how will the present productive capacity of centres like Bombay and Ahmedabad, catering for an India-wide demand, be adjusted to the new conditions of demand and production in the post-war years? The locational changes that have taken place during the last twenty years have already considerably altered the regional distribution of the productive power of the industry. The total productive capacity of the country has been practically doubled between 1921-22 and 1938-39. But most of the manufacturing power responsible for this change has been located outside the city of Bombay in the interior parts of the country. The production from these new units installed in the different parts of the country has mostly gone to replace the cloth imported from outside. At the time of the first enquiry by the Tariff Board (1927) the proportion of the Indian demand for cloth supplied by Indian mills and by imports from abroad was estimated at 36.5 and 35.5 per cent respectively.¹⁷ But in 1938-39, the proportion of the goods of the Indian cotton mills available for consumption in the country was six times that of the imported cloth. As against 42,000 lakh yards

16 Report of the Indian Tariff Board (1927), Vol. III, p. 329.

17 Report of the Indian Tariff Board (1927), Vol. II, p. 155.

of Indian mill cloth the imports of foreign cloth amounted to less than 7,000 lakh yards only.

But it does not imply that the composition of the products of new mills in the interior did not affect the Bombay island industry adversely. The production of yarn and cloth in Bombay city and island in 1921-22 was 3,490 and 2,070 lakh lbs.¹⁸ respectively, while in 1934-35 the production of yarn and woven goods was 2,650 and 2,240 lakh lbs. respectively.¹⁹ The production of woven goods shows some increase but there is a very considerable fall in the production of yarn. The figures of average daily employment given in TABLE II in the previous chapter also point in the same direction. But the production and employment figures do not reveal the true nature of the hardships faced by the Bombay section of the industry during these years. In that regard reference will have to be made to the painful process of liquidations, reconstructions and the scanty and casual nature of the dividends paid by the industry. Between 1924 and 1935 the number of working mills was reduced from 80 to 68 as a result of liquidations; between 1926 and 1931 eleven mills reduced their capital from 8.82 crores to 4.6 crores and the percentage of dividends which was 30 in 1921 came down to only 1.8 in 1935.²⁰ The reserves became depleted and the equipment of many mills deteriorated for want of necessary replacements.

The new mills in the interior have generally captured the markets of Bombay and Ahmedabad for coarse materials in their own areas and have thus forced these centres to change the nature of their production. Both Bombay and Ahmedabad have been trying to go fine and the changes brought about in this direction during the last twenty years are given in TABLE VI opposite.

A perusal of the figures in this table shows that substantial progress had been made towards increasing the production of better quality goods. After the war of 1914-18 the industry has been turning more and more to the manufacture of lighter and finer varieties with colours and fancy weaves. Before the declaration of the war in 1939, superior shirtings, sheetings, long-cloths, fine and medium quality dhoties and saris, printed and dyed goods, mercerized fabrics and many more fancy varieties

¹⁸ Report of the Indian Tariff Board, (1927) Vol. I, p. 9.

¹⁹ Report of the Special Tariff Board (1936), p. 18.

²⁰ B. P. Adarkar: *The Indian Fiscal Policy*, pp. 152-53.

TABLE VI

Progress in quality

| Centre | Yarn | | 1941-42 | |
|---|---|---|---|---|
| | Fine yarn spun in lakh lbs. | Percentage of the total yarn production | Fine yarn spun in lakh lbs. | Percentage of the total yarn production |
| Bombay | | | | |
| 31s to 40s | 60 | 1.7 | 544 | 11.5 |
| Above 40s | 9 | 0.3 | 302 | 6.4 |
| Ahmedabad | | | | |
| 31s to 40s | 56 | 6.5 | 346 | 17.3 |
| Above 40s | 7 | 0.9 | 369 | 18.3 |
| Cloth | | | | |
| Centre | Percentage of total production 1921-22 ²¹ | | Percentage of total production 1941-42 | |
| | | | | |
| Bombay | | | | |
| Grey | | 63.6 | | 71.8 |
| Coloured | | 36.4 | | 28.2 |
| Ahmedabad | | | | |
| Grey | | 93.2 | | 66.6 |
| Coloured | | 6.8 | | 33.4 |
| Yards of Cloth per lb. (Average) | | | | |
| Year | Grey | | Coloured | |
| | Bombay | Ahmedabad | Bombay | Ahmedabad |
| 1926-27 | 4.17 | 4.70 | 4.82 | 5.67 |
| 1936-37 | 4.75 | 5.53 | 4.86 | 6.37 |
| 1941-42 | 4.00* | 6.00 | 4.20* | 7.00 |

²¹ Report of the Indian Tariff Board (1927), Vol. I, p. 102.²² *Ibid.*, pp. 104-5.

* In the case of Bombay the comparison of figures of 1941-42 with those for earlier years is hardly fair in view of the fact that increased quantities of coarse count goods are being produced at present as a result of the war. These goods give more weight per yard than

were being manufactured with the aid of dobbies and jacquards and multiple box looms. This was the result of the introduction of combing, dyeing and bleaching, finishing, mercerizing and printing plants. One hundred and five mills possess dyeing, bleaching and finishing departments, 17 have mercerizing plants and 21 have printing plants. These changes have taken place mostly in Bombay and Ahmedabad. The city of Bombay has been trying to go fine but Ahmedabad has gone finer still and is leading the whole of Indian industry in this respect. From the point of progress in quality Ahmedabad resembles what they call in Lancashire the 'Egyptian Section of the Cotton Industry,' while Bombay, the 'American Section' of the British Cotton Industry.

This movement of the Bombay and Ahmedabad industry is in the right direction. The superior cloth with less bulk and more value can go long distances without adding appreciably to its cost in the form of freight and can command an India-wide market, leaving the regional markets in coarse goods to the local mills in the interior in their respective areas.

The industry at Bombay is admirably located for this type of production. Long-stapled cotton is required for spinning finer counts. The medium and long-stapled cotton suitable for this purpose is grown in India in the Punjab, the C. P. and Berar, Hyderabad, Gujarat, the Southern Maratha country, and Madras. Of these cottons the varieties that are suitable for spinning warp yarn of 30s to 36s are given in TABLE VII opposite.

medium and fine goods. The immediate pre-war (1938-39), averages for Bombay were 4.79 yards and 5.53 yards per lb. in the case of grey and coloured goods respectively. The reason for decline in the percentage of coloured goods from 36.4 to 28.2 per cent is also the same. Although it may also be partly due to the increase in the production of Dhoties as pointed out in the Report of the Bombay Textile Labour Enquiry Committee (1937-38), on p. 14.

Eighty per cent of the cotton industry taken as a whole is now producing coarse cloth. The production of the fine goods may not be more than 6 per cent of the total output. The war orders have resulted in mills going 'coarse' by an average of 23 per cent while the yarn production as a whole has increased by 40 per cent in weight. In Bombay city the production of yarn between 10s and 20s has increased by 54 per cent and the production of cloth is believed to be coarser by 34 per cent in 1942-43 than in 1937-38.

TABLE VII

| Variety of Cotton ²³ | Suitable for warp 30/36s | Suitable for weft 30/36s |
|--|-----------------------------|-----------------------------|
| Broach (Surat, Navsari, 1" staple) | ... | .. |
| Kampta Dharwar (Gadag No. 1, 1" staple) | .. | |
| Western and Northern | ? | |
| Nandyal ($\frac{1}{2}$ " to 1" staple) | | . |
| Hagari ($\frac{7}{8}$ " staple) | | |
| Tinnevelly | | |
| Karunganni ($\frac{7}{8}$ " staple) | | " |
| Irrigated Cambodia (1" to $1\frac{1}{2}$ " staple) | | |
| Punjab and Sind Americans | | |
| • ($\frac{1}{2}$ " to $1\frac{1}{2}$ " staple) | | |

Ahmedabad enjoys an advantage over Bombay in Broach,²⁴ and the South both over Bombay and Ahmedabad, in respect of the Cambodia.²⁵ But in the Hubli, the Dharwar and other cottons grown in Southern Maratha country Bombay scores over all these centres.²⁶

A glance at the table given above will show that purely Indian cotton, even of the best variety, cannot prove of much use for spinning higher counts beyond 36s, without admixture with imported varieties, and that for still higher counts a much larger proportion of foreign cotton will be required. For spinning 60s the Japanese use about 80 per cent Egyptian and the balance Americans (good middling). Even the U.S.A., which produce normally between a half and two-thirds of the world's cotton (including a small quantity of the famous Sea Island cotton of the West Indian islands and the islands off the coasts of Georgia and Carolinas, with a staple as long as $2\frac{1}{2}$ "), and which supply the long-stapled cotton to England, Japan and most of the other cotton manufacturing countries of the world, themselves import Egyptian cotton for spinning finer yarns.²⁷ England and Japan, the two important competitors of the Indian industry, purchase

23 Report of the Indian Tariff Board (1927), Vol. I, p. 259.

24 *Ibid.*, p. 154.

25 Report of the Indian Tariff Board (1927), Vol. II, p. 134.

26 Report of the Indian Tariff Board (1927), Vol. I, p. 155.

27 Li. Rodwell and P. W. Bryan: *North America* (1938), p. 363.

sufficient quantities of Egyptian and other African cottons. Bombay has an advantage over all its internal and external competitors. Freight on American cotton from the Gulf ports to India and Japan is practically the same, while with regard to African cotton Bombay is much more favourably placed. The freight from Tuticorin to Bombay is only half of that from Tuticorin to Japan.²⁸

The first Tariff Board (1927) on Cotton Industry emphasizing this advantage of position with respect to the import of foreign cotton remarked: 'It is essential that Bombay should utilize to the full the natural advantages that it possesses in the matter of climate and of its situation in respect of imports of American or African cotton for the production of goods of higher quality than it has done in the past, that it should devote much less attention than it has done to the production of grey goods, more specially of grey long-cloth and shirtings and that it should embark on a much larger production of bleached and coloured, printed and dyed goods.'²⁹

Bombay, as already mentioned, has made good progress in this direction but as yet it is far from attaining the position envisaged by the Tariff Board. There is no doubt that taking bulk for bulk the production of yarn of higher counts in Bombay is greater than in Ahmedabad, but the proportion of finer counts to the total quantity of yarn produced in each centre is higher in Ahmedabad than in Bombay. The production of higher counts amounts to only about 18 per cent in Bombay while in Ahmedabad it amounts to more than 35 per cent. It has to be borne in mind, however, in this connexion that the production of higher counts at Bombay has been reduced substantially since the beginning of the war (1939) on account of war production. But even after taking into consideration the effect of war production on the quality of the manufactures it is evident that the progress in the production of fine goods has been slow in Bombay in comparison with Ahmedabad. The inability of the Bombay industry to accelerate the pace of this progress may be partly due to the fact that the labour in Bombay is less efficient and more costly than in Ahmedabad. Bombay is, however, trying to improve matters in this direction by introducing rationalization and efficiency schemes (involving reduction in the proportion

²⁸ Report of the Indian Tariff Board (1927) Vol. I, p. 154.

²⁹ *Ibid.*, p. 153.

of labour for a given amount of mechanical equipment)³⁰ in spinning and weaving departments. Besides pushing ahead with these schemes 'the future of the Bombay section of the industry will depend upon the extent to which, by a process of grouping and large-scale production, and concentration on the turning out of special kinds of finer goods, it is able to secure the economies of concentration. For the greater the superiority of large-scale producing units, the more will be the advantage of concentration. By specializing in the production of superior varieties of cloths and non-competitive goods, where the economies of large-scale production may be realized, Bombay may still be able to maintain her ground.'³¹

But there is no doubt that a considerable proportion of its manufactures of coarse goods (requiring yarn below 30s.) will have to be given up in favour of the units already existing in the interior or about to come into existence in the post-war period.

After Bombay Ahmedabad is the next important centre of the cotton textile industry which is likely to be affected by an increase in the production of cotton goods in other regions of India. The success achieved by this centre in its efforts to adapt itself to new conditions is very well illustrated by the facts given in TABLE VI (p. 51), which go to show that it is in a very strong position to face the internal competition in most of its lines of fine manufactures. From the point of view of geographical situation, Ahmedabad, with its surrounding region of Gujarat and Kathiawar, is the only centre in India which resembles the great cotton centre of Manchester situated in Lancashire region, and probably for this reason it is called by some 'The Bolton of the East'. It is situated in the midst of a region growing Broach and Dholeras, the two important varieties of cotton predominantly used here,³² and its nearness to the sea enables it to import foreign—the East African and the Egyptian—cotton easily. For selling its manufactures it has an advantage over Bombay in the great cloth markets of Amritsar, Delhi and Cawnpore.³³

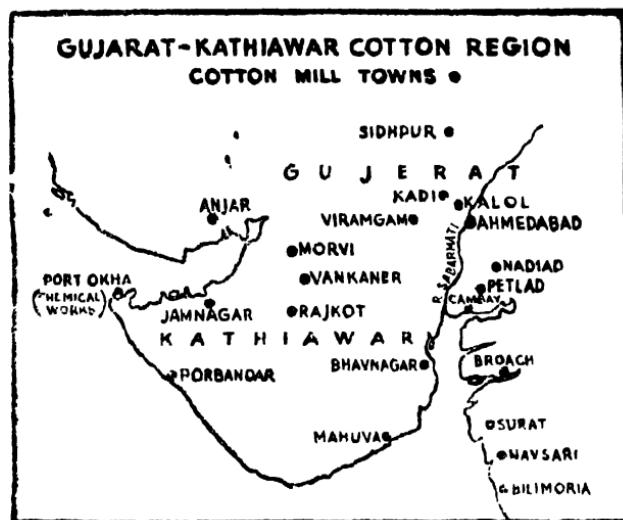
30 Report of the Bombay Textile Labour Enquiry Committee (1937-38), p. 14.

31 P. S. Lokanathan: *Industrial Organization in India*, p. 62.

32 Report of the Bombay Textile Enquiry Committee (1937-38), p. 70.

33 Report of the Indian Tariff Board (1927), Vol. II, p. 192.

In the matter of labour, one feels inclined to say, perhaps Ahmedabad textile labour is the most efficient in the whole of



India. A very large majority of the labour force in this centre is permanent and Ahmedabad, along with other towns of the Gujarat and Kathiawar region engaged in cotton spinning and weaving, constitutes a very good unit for the development of skilled and specialized labour of the best quality.

Recently some subsidiary industries have also come to be established in this region. The manufacture of starch has been started in Ahmedabad itself and reeds and beards are being manufactured in some other towns. Most significant of all is the establishment of the Tata Chemicals Ltd. at Mithapur, near Port Okha in Kathiawar, for the manufacture of heavy chemicals like soda ash, bleaching powder, etc. to be used in textile and other industries.

The lead that Ahmedabad is taking in the manufacture of fine fabrics reflects the capacity of this centre to take the utmost advantage of its excellent position and resources. The small industrial units (in comparison to Bombay) of this centre enable the manufacturers to accept small orders even, including the stamping of the names of outside wholesale dealers, to meet the requirements of the markets.

But the industry at Ahmedabad has practically attained its full stature and any further increase in its size is likely to

provoke a strong reaction of the deglomerating tendencies which are already in operation.³⁴ The trend of developments shows that there are chances of coarse goods being further replaced by superior fabrics in this centre, leaving the former to be manufactured by the local mills in other regions of India.

The changes that are taking place in the two most important cotton textile centres of India have been considered in some detail. But taking the cotton industry of the country as a whole a tendency leading towards double specialization—regional and qualitative—appears to be at work. The establishment of a fairly large number of purely spinning mills in the province of Madras, more stress on the production of cloth than yarn in Bengal, increase in the production of mixed and artificial yarn (art silk, rayon and staple fibre) fabrics in the Punjab, manufacture of standard qualities of goods in the Bombay city and island, production of fabrics of a varied nature at Ahmedabad, manufacture of khaki drills and jeans at the Buckingham and Karnatak Mills (Madras), and preparation of tents and durries at the Elgin and Muir Mills (Cawnpore) may be cited as examples of regional specialization; while the efforts of the older and bigger centres of industry like Bombay, Ahmedabad, Sholapur and Nagpur to change over from the production of coarse goods to the manufacture of superior types of fabrics may be taken as an example of qualitative specialization. The consumption of imported long-stapled cotton in these centres gives an idea of their attempts to improve the quality of their goods.

TABLE VIII

| Name of Centre | Percentage of the receipt of foreign cotton at the mills to the total receipt of all cotton (Average for 3 years—1934-35 to 1937-38) |
|--------------------------------------|--|
| Ahmedabad ³⁵ | 36.9 |
| Bombay ³⁶ | 20.4 |
| Sholapur ³⁷ | 9.5 |
| Nagpur ³⁸ (Empress Mills) | 4.75 (For one year only) |

³⁴ Seth Sakarilal Balabhai, delivering the Presidential address at the Annual General Meeting of the Mill Owners' Association, 1939, observed: '.... the trend of developments in our industry has taken a different course from that in the past, inasmuch as since 1933 no

The production of fine yarn in different provinces also gives an indication of the specialization trends. The percentages of the production of yarn over 30s are given below.

TABLE IX
Production of Fine Yarn
(On a Provincial Basis)

| Province | Percentage of all-India production of yarn in 1941-42 | |
|----------|---|-----------|
| | 31s to 40s | Above 40s |
| Bombay | 6.2 | 4.5 |
| Madras | 3.0 | 1.2 |
| Bengal | 0.3 | 0.3 |
| U. P. | 0.4 | — |
| C. P. | 0.1 | — |

It is clear that on account of the necessity of importing long-stapled cotton for spinning higher counts, only maritime centres in the maritime provinces can hope to develop the production of finer qualities of cotton goods. Besides this, provinces like Madras, Delhi, the C. P., and the Punjab which grow long or medium-stapled cotton can also produce medium quality goods. It is noteworthy in this connexion that the production of raw cotton (from the point of view of variety) in Northern India (except the Punjab) is marked by the dull monotony of desi (or Bengal) variety while Central, Western and Southern India are very rich in indigenous as well as in exotic varieties.

The changes discussed above are very significant as they point out the way the future development of the cotton industry is likely to follow. They may lead eventually to a stage when the local demand for coarse goods may be supplied very largely in most parts of the country by the units of industry located within the various regions themselves and when only specialized units suitably placed for the purpose will cater for India-wide markets by supplying fine and costly fabrics. Such location and distribution of the units will also enable the industry to cope with the severest foreign competition.

new mills have been erected in Ahmedabad, and eight mills have been scrapped or changed hands.'

35 Report of the Bombay Textile Enquiry Committee (1937-38), p. 70.

36 Report of the Textile Labour Enquiry Committee of the C.P. and Berar (1938), p. 31.

The picture given above refers to a future date. At the present time more than four-fifths of the counts spun by Bombay and nearly two-thirds of the counts spun by Ahmedabad are below 30s. A considerable proportion of these may have to be replaced by higher counts. There are, however, some very important factors which, properly manipulated can help to make the changes during the period of transition very smooth. One of these factors is connected with the nature of imports of piece-goods in India, figures for which for three years are given below.

TABLE X
Imports of Cotton Piece-goods

| | 1937-38 Yds. | 1938-39 Yds. | 1939-40 Yds. |
|-------------------------------------|---------------------------------|---------------------------------|---------------------------------|
| 1. From British Empire | 27,03,20,394 | 21,31,10,023 | 15,86,47,714 |
| 2. From foreign countries | 32,04,78,030 59,07,98,424 | 43,41,54,361 63,72,64,384 | 42,03,54,853 57,90,02,567 |
| 3. The share of Japan in item No. 2 | 30,60,45,392 (95.6 per cent) | 42,48,08,235 (97.9 per cent) | 39,33,73,802 (93.5 per cent) |

It will be seen from the figures given above that nearly 95 per cent of the imports from countries other than those in the British empire come from Japan. About 40 per cent of these imports generally consisted of long-cloth, shirtings, drills and jeans prepared from yarn below 30s. The war has come to an end after reaching the Japanese homeland, and if the Indian industry succeeds in annexing this important slice of the Indian home market, which it is most likely to do, the competition in coarse goods between centres like Bombay and Ahmedabad on one side and the regional units of the interior on the other may not be very keen for some time to come.

During the last war, Indian piece-goods have made a tremendous headway in the export markets of the Middle and Near Eastern countries, and if the industry is able to consolidate even a part of these gains in the post-war period, the centres of

industry situated on or near the sea-coast (like Bombay and Ahmedabad) would be assured of a substantial volume of export demand.

Then again, if India succeeds in raising the standard of living of her rural population by any of the plans—Government's or Industrialists'—only the demand for coarse varieties of cloth will be increased to such an extent that all types of manufactures of the country taken together would hardly be able to keep pace with it. One of the extremely modest ambitions of the National Planning Committee was to step up the per capita annual consumption of all types of cloth from 16 yards to 30 yards. To achieve this object more than 110,000 lakh yards of cloth of coarse varieties will be required on the basis of the population as enumerated in 1941.³⁷ The pre-war production of the Indian mills and hand-loom, of all varieties taken together (mill production between 42,000 and 44,000 lakh yards plus hand-loom production from 13,000 to 14,000 lakh yards), does not amount to more than half the quantity required. This development alone will be enough to provide full employment to the existing as well as future units of the industry in different regions of India for some years to come. During the transitional period the change-over from coarse to fine fabrics may be easily carried out by centres like Bombay and Ahmedabad.

The redistribution of the industry discussed in these pages is both possible and desirable. But much depends upon our ability to make the best of opportunities that may offer themselves in the post-war period and upon the degree of freedom that is allowed to us, or that we are able to achieve, in these matters under the changed political conditions of the post-war world.

CHAPTER IV

THE WOOLLEN INDUSTRY IN CAWNPORE AND DHARIWAL

Wool like cotton is a pure fibre as it does not lose in weight in the process of manufacture. As it is a more valuable material than cotton and can stand higher transport charges, the woollen industry develops a tendency towards 'market-localization'. But on account of climatic reasons the sources of raw material supply and the markets for the woollen goods are found to exist together. Woollen garments are a necessity only in the cold countries or the temperate regions and it is again in such regions that nature helps certain animals like sheep to develop excellent fleece to protect them against cold.

On account of climatic reasons, most of the European countries originally started woollen industries to meet their own requirements and depended for raw materials upon indigenous resources. Later on, when a number of European powers had acquired colonial empires and when commerce had become world-wide, the woollen industries of these countries began to supply the overseas markets in less developed or industrially backward countries. The increased demand of the home industry for raw materials was met from colonial and other sources.

Simultaneously with increased demand for raw wool, new lands were discovered and some of them like Australia and Argentine proved to be especially suitable for sheep-breeding. Before the provision of refrigeration and cold storage on ships, the sheep in the new lands could not be used for supplying meat to Europe, and therefore the wool yielding aspect of breeding was stressed more and heavy wool yielding stocks of sheep were developed. These developments in the Southern hemisphere helped England and other European countries to supplement their own supplies with Australian and colonial wool and their home industries entered the world markets.

India was one of the overseas markets for the woollen industry of England. From the climatic point of view, India is regarded as a tropical country although her northern plains and mountain regions lie entirely outside the tropics. During the winter season the climate of these regions becomes cold enough to create a

demand for woollen garments. Owing to the existence of this demand and the availability of indigenous raw materials, the manufacture of woollen goods as a cottage industry existed in all these parts since times immemorial. This industry did not confine itself to the production of ordinary woollen goods for local needs but like the celebrated Dacca muslins prepared an equally renowned article—the Kashmir shawls—for sale in India and abroad.

Although Northern India produced suitable types of wool to serve as a basis of her woollen industry, the local resources were supplemented by importing finer varieties of wool for special purposes from the neighbouring countries of Persia, Afghanistan, Central Asia and Tibet. Pashum or shawl wool, the under fleece of a breed of goats known as Ibex, a singularly soft and fine fibre used for the manufacture of the famous Kashmir shawls, was obtained from the Chinese Province of Tartary.¹ Thus even before the beginning of the modern factory manufacture of woollen goods, India had access to supplementary sources of supply beyond her own frontiers.

For meeting the requirements of a fair-sized woollen industry organized on modern lines, the indigenous resources of India are quite considerable and of a varied nature. All Indian wools do not fall into the class hitherto designated as 'carpet-wool', many of them are really something superior.² The finest types of the Indian wool are produced in the hilly parts of Baluchistan, the North-West Frontier Province and the Kashmir State. Wools from some parts of the Mysore State and the lamb wool from the Bikaner State also belong to the same class. According to the proposed classification of the Central Agricultural Marketing Department of the Government of India, this type of wool is to be called 'North India Superior Clothing White' and is suitable for the production of a yarn of good medium quality for preparing standard types of lohis or shawls, which are largely made in India from imported 46-56s. The country bounded by the areas named above on one side and by a line drawn between Bombay and Cawnpore on the other is the most important region on the plains for producing clothing, rug and carpet wools.

Besides this home production a good deal of wool from Tibet, Chinese Turkistan, Afghanistan, and even Persia and Iraq

¹ Silverman and Mehta: *Notes on Wool in India*, pp. 2-3.

² Handbook on the Quality of Indian Wool, p. 17.

TABLE XI³

The distribution of Indian wool production according to the proposed classification of the Central Agricultural Marketing Department of the Government of India

| Quality classification | Quantity produced annually (Lakhs of lbs.) | Percentage of Indian production | Areas of Production |
|-------------------------------------|--|---------------------------------|--|
| | | | ♦ |
| North India Superior Clothing White | 42 | 4.9 | N.-W. F. P., North-Western Parts of Kashmir State, and Baluchistan, Parts of Mysore State and the Bikaner State (the Lamb Wool) |
| North India Clothing White | 380 | 44.7 | Sind, Khairpur, Bahawalpur, Rajputana and Western India States and South-Western Parts of the Punjab |
| North India Rug White | 105 | 12.4 | Western Tracts of the Punjab, Western U.P., Western Parts of C. P., and the Northern Parts of the Bombay Province |
| North India Carpet | 85 | 10.0 | Areas mentioned above (Low quality wool including skirtings, etc.) |
| South India Blanket | 200 | 23.5 | Eastern U.P., C. P., Bombay, Madras and Mysore and Hyderabad States |
| South India Tannery | 38 | 4.5 | Tannery and pulled wool including low quality wool mainly from certain parts of Bombay, C. P., Madras, and Hyderabad and Mysore States |
| Total | 850 | 100.0 | |

finds its natural market in India. The wools from these countries are superior in quality to most of the Indian wools.⁴ A major portion of this imported wool, however, is re-exported from India. If the Indian demand for this class of wool and the means of communication with the frontier countries improve, abundant material of a similar quality would be available for further

³ Handbook on the Quality of Indian Wool (1942), p. 42.

⁴ Report of the Indian Tariff Board on the Woollen Textile Industry (1935), p. 7.

expansion of supplies from these sources. Thus the wool grown in India, supplemented by arrivals from the frontier countries is capable of giving enough good quality wool to meet the entire demand of the Indian woollen industry.

The local supplies of raw wool for the manufacture of worsteds are of a limited nature. The North India Superior Clothing White and a part of the Frontier wools can be utilized for this purpose, but for the major part of its raw wool requirements the worsted section is dependent upon Australia. In this respect, however, the Indian industry is not at a disadvantage, as the worsted industry of all the chief competing countries is in exactly the same position.

The markets for the woollen goods are situated mostly in Northern India, but on account of climatic reasons the demand is strictly seasonal. Sales do not ordinarily take place except during the three or four months at the beginning of the cold season. And since the Indian mills have no export trade, their production for open market is reduced to the period required to fulfil these seasonal orders. It has, therefore, been of the utmost importance to secure government contracts to enable them to keep their works open during the off-season. The limited nature of the market handicaps the industry in yet another way. The requirements of the market are of an immense variety and to meet these varied requirements, both in woollens and worsteds, the Indian mills are compelled to attempt to make something of every variety; while in most other countries of the world, where the industry is organized to supply the world market, there is a very great specialization resulting in economies and efficiency. In India a very large number of departments entails the employment of a high proportion of supervisors to maintain efficiency in so many different lines. But as figures in TABLES XII to XV show, there is considerable scope for further expansion of the market.

The year 1939-40 does not provide a basis of fair comparison as the war which broke out in September 1939 upset the normal trade. The figures for 1937-38 and 1938-39, given in the tables below, show that nearly three-fourths of the woollen and worsted piece-goods, 96 per cent of shawls and lohis and 99 per cent of the blankets and rugs came to India from Japan, Germany and Italy. Of the goods mixed with other materials practically one-fourth of the total imports also came from these

TABLE XII

Imports of Woollen and Worsted piece-goods

| Country from which imported | 1937-38 (Yds.) | Per cent- age of the total | 1938-39 (Yds.) | Per cent- age of the total | 1939-40 (Yds.) | Per cent- age of the total |
|-----------------------------|----------------|-------------------------------|----------------|-------------------------------|----------------|-------------------------------|
| British Empire | 14,90,788 | 22.2 | 8,64,740 | 34.5 | 6,55,993 | 28.4 |
| Japan | 45,30,443 | 67.4 | 12,53,933 | 50.1 | 15,34,508 | 65.9 |
| Germany | 3,09,954 | 4.6 | 1,41,584 | 5.6 | 33,079 | 1.3 |
| Italy | 3,03,980 | 4.5 | 1,67,472 | 6.8 | 81,963 | 3.8 |
| Others | 88,701 | 1.3 | 70,462 | 3.0 | 17,964 | 0.6 |
| | 67,23,866 | 100.0 | 24,98,200 | 100.0 | 23,23,507 | 100.0 |

TABLE XIII

Imports of shawls and lohis

| Country from which imported | 1937-38 | Per cent- age of the total | 1938-39 | Per cent- age of the total | 1939-40 | Per cent- age of the total |
|-----------------------------|----------|-------------------------------|----------|-------------------------------|----------|-------------------------------|
| British Empire | 19,888 | 4.0 | 1,483 | 0.3 | 942 | 0.6 |
| Japan | 1,76,427 | 35.5 | 3,52,316 | 73.3 | 1,41,438 | 94.7 |
| Germany | 2,86,147 | 58.0 | 1,04,930 | 21.9 | 5,735 | 4.0 |
| Italy | 10,000 | 2.0 | 3,500 | 0.9 | 1,000 | 0.7 |
| Others | 853 | 0.5 | 16,559 | 3.6 | 340 | — |
| | 4,93,315 | 100.0 | 4,78,788 | 100.0 | 1,49,458 | 100.0 |

TABLE XIV

*Imports of blankets and rugs
(including mixed)*

| Country from which imported | 1937-38 (lbs.) | Per cent- age of the total | 1938-39 (lbs.) | Per cent- age of the total | 1939-40 (lbs.) | Per cent- age of the total |
|-----------------------------|----------------|-------------------------------|----------------|-------------------------------|----------------|-------------------------------|
| British Empire | 39,910 | 0.7 | 40,939 | 1.0 | 33,958 | 1.7 |
| Italy | 49,91,121 | 95.8 | 40,34,848 | 98.8 | 16,49,495 | 96.3 |
| Germany | 53,356 | | 3,209 | | 994 | |
| Japan | 41,841 | | 2,283 | 0.2 | 25,722 | 1.6 |
| Others | 92,411 | 1.7 | 754 | | 8,199 | 0.4 |
| | 52,18,639 | 100.0 | 40,82,033 | 100.0 | 17,18,368 | 100.0 |

TABLE XV

Imports of goods mixed with other materials

| Country from which imported | 1937-38 (Yds.) | Percen- tage of the total | 1938-39 (Yds.) | Percen- tage of the total | 1939-40 (Yds.) | Percen- tage of the total |
|--------------------------------|-------------------|---------------------------------|-------------------|---------------------------------|-------------------|---------------------------------|
| British Empire | 26,79,801 | 71.3 | 16,60,225 | 71.6 | 7,02,492 | 57.4 |
| Japan | 6,44,112 | | 3,32,744 | | 2,73,498 | |
| Italy | 1,53,616 | | 2,14,233 | | 1,76,225 | |
| Poland | 98,666 | 28.7 | 68,227 | 28.4 | 38,218 | 42.6 |
| Germany | 38,230 | | 27,040 | | 9,924 | |
| Others | 4,974 | | 18,237 | | 15,252 | |
| | 36,19,399 | 100.0 | 23,20,706 | 100.0 | 12,15,609 | 100.0 |

countries. Taking all these goods as a whole, the contribution of Japan to the total imports appears to be the most important.

What was the secret of the success of these countries in capturing the Indian market? The answer to this question is that they offered an attractive article, though inferior in quality to most of the indigenous goods, at a price which the average buyer in India could afford to pay. The market for woollen goods in India is limited not only by climatic considerations but also by the extreme poverty of the people. The woollen clothes for ordinary wear are used only by the middle and upper classes of people living in the cities and towns. Pure woollen cloth is beyond the purchasing power of the rural masses of India and the costly cloth manufactured by our mills from pure wool falls into that category.

Italy and Japan took the fullest advantage of this situation. They sold mixed woollen articles of a very good finish at very cheap rates. The mixing of wool with cotton and other fibres and the manufacture of woollen articles from shoddy are a part of the woollen industry of most countries of the world. Shoddy looks like other wool and the manufacturers are able to turn it into a soft and attractively finished article which is preferred by the possibly ignorant buyer to an article made of an inferior virgin wool which cannot be made to look so attractive. Italy and Poland sent to India generally shoddy fabrics while Japan supplied mixtures of cotton or staple fibre. The fact that cotton or staple fibre can be mixed with shoddy wool makes it possible for an attractive article to be manufactured at a cost equal

to, or even lower than, that of the cheapest Indian product made of pure virgin wool. The information about the constituents of a Japanese blanket given by the Indian Tariff Board on Woollen Textile Industry in their report is illuminating. They observe: We have discovered no blanket or rug passing as woollen that contains less than 50 per cent wool except from Japan, one of which was found on analysis by the Customs Department to contain the following⁵:

| | |
|-----------------|-------------|
| Wrap—all cotton | 19 per cent |
| Weft —wool | 24 " |
| cotton | 37 " |
| artificial silk | 7 " |
| hemp | 13 " |
| | <hr/> |
| | 100 |

The analysis given above would show that no genuine article of pure wool manufactured by the Indian industry could ever stand competition against such mixtures, and accordingly the shoddy rug ousted the India-made blanket and rug from the market, and the shoddy cloth not only took the place of the hand-made tweeds but on account of its cheapness and superior finish prevented the sale of the Indian mill-made cloths of the same type manufactured from virgin wool.

The woollen industries of some of the important competitors of the Indian industry like Japan, Germany, Italy and Poland will not be in a position to export substantial quantities of goods for some years to come after the cessation of hostilities. This period will provide an opportunity to the Indian woollen industry to annex this important slice of the home market for extending the scope of its operations. For achieving this object the Indian industry should take up the manufacture of cheaper articles by mixing other textile materials with wool. The recommendation of the Tariff Board in this connexion is significant as they were strongly in favour of mixtures in the articles of superior quality. The report says: 'There is, so far as we know, no valid reason, except the difficulty of specialization, why the Indian mills should refrain from making these mixtures.... There is a great and increasing demand for mixed fabrics throughout the world, and the indications are that this demand has come to

⁵ Report of the Indian Tariff Board on Woollen Textile Industry (1935), p. 54.

stay.... Rayon and staple fibre production is always creating new records. All this indicates that the long continued reliance on the natural qualities of pure wool for clothing is breaking down. Fashion is rejecting the claim of pure wool to be a superior product and in India climate supports fashion. If the mixture of other fabrics with wool is to be a factor of increasing importance in the industry, we consider that this branch of manufacture should be treated on its merits, and not regarded as a mere, unwarranted competitor with pure wool. In this instance the industry must conform to the dictates of fashion, if it is to progress. Mixtures are not manufactured only in order to achieve cheapness but more often in response to demand.⁶ The scope of such mixtures is likely to be widened in future with the progress in the development of synthetic plastics. They can be employed to impart to rayon fibre the resilience of wool and to cotton fabrics the stability of a high-class worsted.⁷

Besides this, there is considerable scope for the extension of the market in yarn for supplying the hand-loom industry. There is a very large number of these looms in Northern India. From the plains towards the hills the relative importance of the woollen industry, as compared to cotton, goes on increasing till in the hilly tracts, where the woollen wear can be used throughout the year, the woollen industry assumes greater importance than any other textile. The looms in the U.P., the Punjab and Kashmir produce not only various classes of tweeds and puttoos, which are classed as woollens but also shawls, chaddars and saris made of finer material, much of which is worsted quality. In the woollen section mostly the hand-spun yarn of local wools is used, but the recent tendency is to use mill-spun yarn in order to give a more regular structure and a superior finish to the cloth. In the worsted section hand-spun yarn is still used in Kashmir but in the U.P. and the Punjab mill-made marino yarn of a fine quality imported from abroad is used. In addition to this, considerable quantities of knitting wool are also imported. The figures of these imports are given below.

The figures given below show that in 1937-38 and 1938-39 more than 97 per cent of the worsted yarn and between 70 and 78 per cent of the knitting wool were received from the

⁶ Report of the Indian Tariff Board on Woollen Textile Industry (1935), pp. 62-3.

⁷ *Indian Textile Journal*, June 1942, p. 249.

TABLE XVI
Imports of Worsted Yarn

| Country from which imported | 1937-38 (lbs.) | Percen- tage of the total | 1938-39 (lbs.) | Percen- tage of the total | 1939-40 (lbs.) | Percen- tage of the total |
|-----------------------------|----------------|------------------------------------|----------------|------------------------------------|----------------|------------------------------------|
| British Empire | 32,257 | 1.8 | 36,696 | 1.9 | 9,379 | 0.6 |
| Japan | 15,39,741 | 94.5 | 17,73,250 | 82.0 | 16,50,981 | 95.4 |
| Poland | 44,971 | 3.0 | 3,34,815 | 15.3 | 66,126 | 4.0 |
| Others | 12,181 | 0.7 | 15,665 | 0.8 | — | — |
| | 16,29,150 | 100.0 | 21,60,426 | 100.0 | 17,26,486 | 100.0 |

TABLE XVII
Imports of Knitting Wool

| Country from which imported | 1937-38 (lbs.) | Percen- tage of the total | 1938-39 (lbs.) | Percen- tage of the total | 1939-40 (lbs.) | Percen- tage of the total |
|-----------------------------|----------------|------------------------------------|----------------|------------------------------------|----------------|------------------------------------|
| British Empire... | 2,16,391 | 18.3 | 2,05,224 | 17.5 | 1,51,939 | 14.3 |
| Japan | 8,31,408 | 69.2 | 8,54,628 | 70.9 | 8,92,765 | 84.2 |
| Germany | 17,585 | 1.6 | 18,775 | 1.6 | 6,074 | 0.6 |
| Poland | 16,459 | 1.5 | 57,216 | 5.0 | — | — |
| Others | 1,12,400 | 9.4 | 59,585 | 5.0 | 8,220 | 0.9 |
| | 11,94,243 | 100.0 | 11,95,428 | 100.0 | 10,58,998 | 100.0 |

countries which are not expected to be in a position to resume exports to India in the immediate post-war period. It will also be noticed that the goods, the figures for which have been given in the TABLES XIII, XIV and XV, also came from the same set of countries and taking the total amount of all types of woollen and worsted goods, Japan tops the list of the countries from which these goods were imported. If the post-war opportunities are properly utilized there is a vast scope for the extension of the home markets of the Indian woollen industry.

To sum up the position of the industry as regards raw materials and the markets, the conditions are favourable for the manufacture of woollen goods in north-western U.P., the Punjab

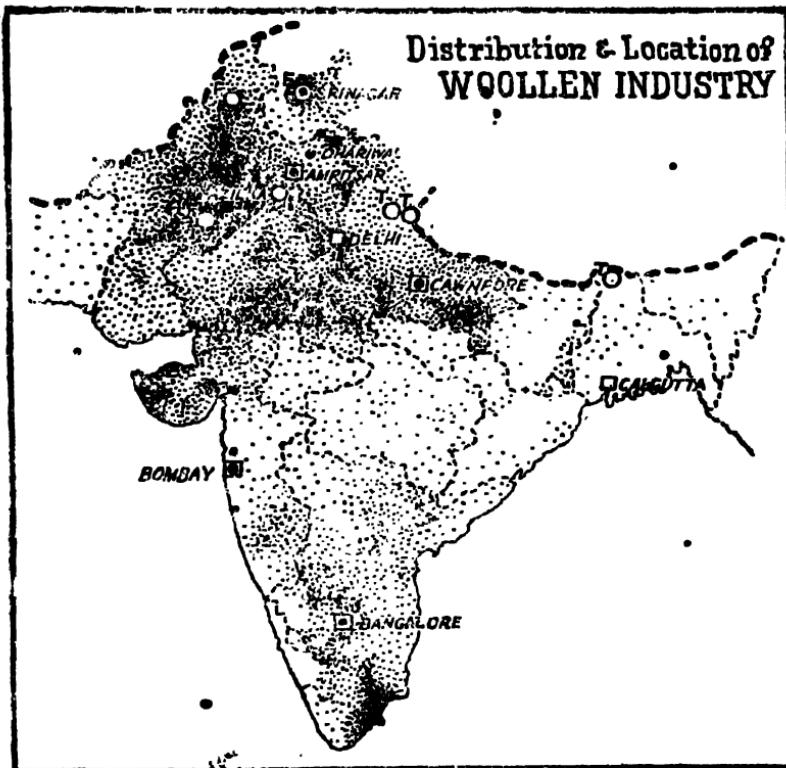
and Kashmir. The principal mart for best Indian wools is at Fazilka in south-eastern Punjab; the markets for Tibetan wool are situated at Tanakpur and Haldwani; and the centres for receiving the wool from Central Asia and Afghanistan are at Quetta, Shikarpur, Multan, Amritsar and a number of towns in Kashmir. The main consumers' markets for woollen cloth are also confined to Northern India.

From the point of view of labour, the position of the industry in north-western U. P., the Punjab and Kashmir is fairly satisfactory. The hand-loom industry is of considerable importance in all these areas and a supply of unskilled as well as of semi-skilled labour accustomed to some form of hand spinning and weaving of wool is available. But the fact that the units of the industry are far apart from each other makes it difficult to get back trained labour when once it is parted with. The relative inefficiency of the Indian workmen in finer work is undoubtedly due chiefly to lack of experience and this follows from the fact that in normal times there is not enough work for the mills to keep their workmen fully employed throughout the year. There are indications that the position of the industry in the Punjab may be improved in this respect on account of the location of the units of woollen industry in towns like Dhariwal, Amritsar and Ludhiana, which are not far from each other.

On the whole, the circumstances were more favourable for the development of the woollen industry in the Punjab and Kashmir than in the U. P. But on account of historical reasons, the first modern woollen mill came to be established at Cawnpore, in the year 1876. Cawnpore, although a very insignificant town at that time, occupied a very important strategic position from the military point of view, as it was situated just on the borders of the kingdom of Oudh. After the Mutiny the Government established a large arsenal here. In order to supply the requirements of the military, a number of industries were started and the Lal Imli woollen mills was one of them.

Although the woollen mills of Cawnpore were first started to meet military requirements, their location from the economic point of view is also quite scientific. The town is situated just on the outer margin of the main wool growing region of India and is quite near to the main markets of the Indian and frontier wools. From the point of view of consumers' markets, it lies in a central position in Northern India and it has become a very important

Distribution & Location of WOOLLEN INDUSTRY



N. S. H. BENTON

PRODUCTION OF RAW WOOL

MARKETS OF RAW WOOL:- T = TIBETAN, F = FRONTIER, I = INDIAN..○

WOOLLEN TEXTILE CENTRES:-

IMPORTANT CENTRES

OTHER CENTRES

TEXTILE DISTRIBUTING CENTRES

distributing centre for all kinds of textiles for Central India, Bihar, the U. P., and the adjacent parts of Rajputana. Coal for power is also available easily from the coal-fields of Bengal.

The location of the new Egerton Mills at Dhariwal is the best in all these respects. The mills are situated in the very heart of the main wool growing region and most of the important consumers' markets for woollen goods in India. The town is situated in the midst of the principal raw wool markets of India—Tanakpur and Haldwani to the east, Multan and Peshawar to the west, Fazilka to the south and Kashmir to the north. For the distribution of the finished goods, Amritsar, one of the biggest textile distributing centres of India, is quite near. Labour familiar with hand spinning and hand weaving of woollen yarn and cloth is available locally and electric power to run the machinery is generated from the canal falls in the neighbourhood.

Cawnpore and Dhariwal are the two important centres of woollen industry in India. In the south the climatic and other conditions favourable for the manufacture of better and finer types of woollen articles exist only in the Mysore State. But as the major part of supplies of wool for the manufacture of worsteds is received from Australia, the break localization of woollen industry is also possible in the port towns like Bombay. In other parts of the country, only inferior types of woollen goods meant for local consumption are manufactured.

The distribution of the woollen textile industry is shown in TABLE XVIII opposite.

The analysis shows that more than 70 per cent of the average daily labour is employed in Northern India; the Punjab and the U. P. taken together account for about 60 per cent of the total employment. The only important region outside the U. P. and the Punjab is the presidency of Bombay, which, along with Baroda State, employs 25.6 per cent of the total average daily labour.

In case the Indian mills take up the production of mixtures, as suggested by the Tariff Board, and thereby bring the prices of woollen goods within the reach of the ordinary people, the home market is likely to be increased considerably. Such an extension of the market will not only create more work for the mills and keep them working throughout the year but will also make a certain degree of specialization possible. As pointed out earlier, the Indian mills, particularly those of the joint woollen

TABLE XVIII

The regional distribution of woollen industry

| Region or area | Number of mills | Average Number of persons employed daily (1939) | Percentage of all-India total |
|--------------------|-----------------|---|-------------------------------|
| Western India | | | |
| Bombay Island | 3 | 1,025 | |
| Thana | 1 | 759 | |
| Baroda | 1 | 332 | 25.6 |
| Rajputana | 3 | 2,116 | 1.2 |
| 95* | | | |
| Southern India | | | |
| Bangalore (Mysore) | 1 | 64 | |
| Bellary (Madras) | 1 | 52 | 1.3 |
| 116 | | | 28.1 |
| Northern India | | | |
| Srinagar (Kashmir) | 1 | 347** | 4.1 |
| Dhariwal (Punjab) | 1 | 1,960 | |
| Amritsar (,,) | 1 | 701 | 32.2 |
| Cawnpore (U. P.) | 1 | 2,661 | |
| Mirzapur (,,) | 1 | 2,311 | 28.6 |
| Bhagalpur (Bihar) | 1 | 51 | 5.0 |
| Dacca (Bengal) | 1 | 2,362 | |
| 413 | | | 71.9 |
| 161 | | | |
| 8,271 | | | 100.0 |

* Seasonal.

** 8,930 Workers employed by the All-India Spinners' Association (working on a cottage industry basis) have been excluded.

and worsted type, are attempting to make something of every kind to meet the demand for an immense variety of goods. But with an increase in demand for all types of goods, some measure of specialization can be achieved by leaving to the woollen mills the market in the lowest quality of blankets and rugs and other woollen textiles for which they are peculiarly fitted by their location and their experience. Dhariwal, Cawnpore and Bombay mills, on the other hand, may devote themselves more usefully to the production of worsted and finer types of woollens. This arrangement would also tend to reduce the existing intense competition of the mills with the hand-loom industry.⁸

⁸ Report of the Indian Tariff Board on the Woollen Textile Industry (1935), p. 54.

CHAPTER V

LOCALIZATION OF THE JUTE INDUSTRY IN THE HOOGHLY RIVERAIN

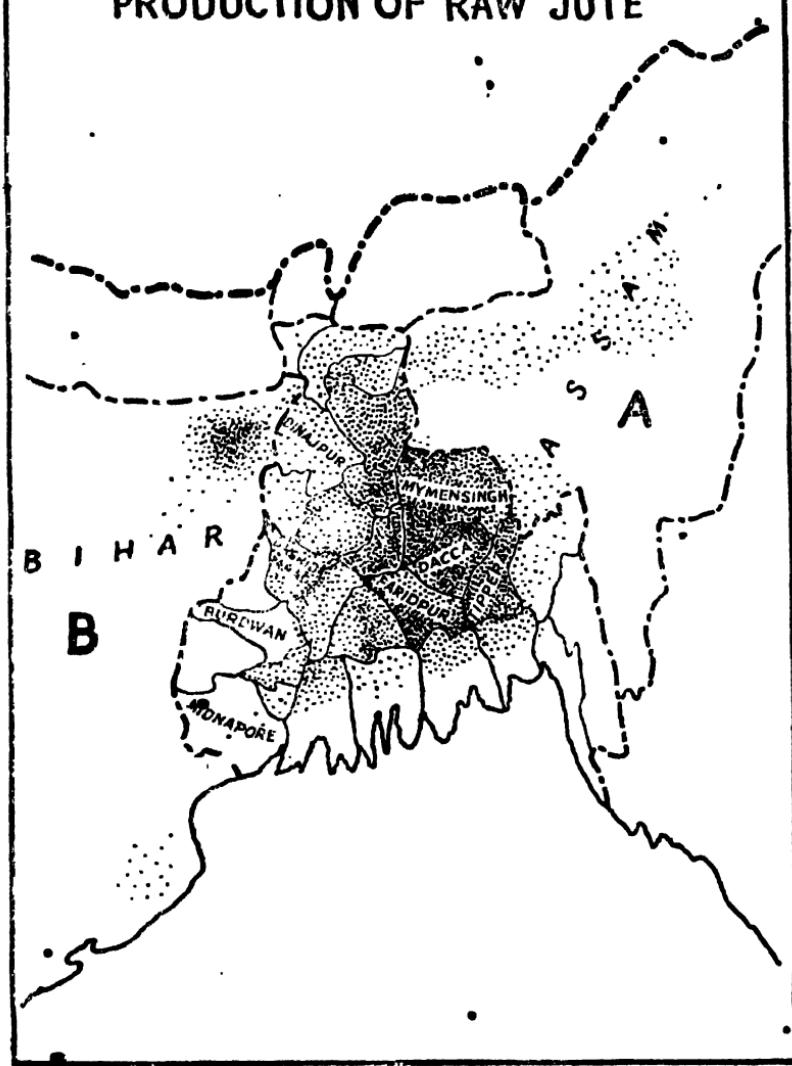
Among the vegetable fibres of India jute ranks next to cotton in importance. It is obtained from the bast of slender annuals, which grow from eight to twelve feet in height. The cultivation of this plant on a large scale for obtaining the fibre is almost confined to the northern and the eastern parts of Bengal, except for small quantities grown in other areas of Bengal, Assam and Bihar. The conditions of soil and climate governing the distribution of jute cultivation in Bengal have been summarized by Dr Radhakamal Mukerjee as follows:

'Jute can be grown in almost any type of soil which has the necessary depth as well as sufficient water to keep the soil moist. A swampy soil and an excessively damp atmosphere are not necessary for its successful growth. In fact, the finest jute in Dacca is grown on land which never goes under water. Jute grown on a higher level produces a superior fibre to that cultivated in low lying areas. Thus jute thrives well in most parts of Bengal, but best of all in rich alluvial areas in Eastern Bengal, for it is an exhausting crop. On higher lands, which are never submerged, or on soil not benefited by inundation silt, it is necessary to manure for each crop of jute.... Jute avoids not only older alluvium or red laterite but also the salt impregnated soils. Both for climatic and soil factors, the area of jute has not expanded beyond certain geographical limits in Bengal. As regards humidity and rainfall, we find that the cultivated area under jute and average outturn per acre are much higher in tracts of higher humidity and higher early and late rainfall.... Thus Dacca, Mymensingh, Tippera and Faridpur, which all possess higher humidity and rainfall, are the best producers of jute in the Province.'

As a raw material jute is practically a monopoly of India. She produces more than 97 per cent of the total world supply. Systematic attempts have been made in countries like Brazil and Iran to grow jute but so far no substantial success has been

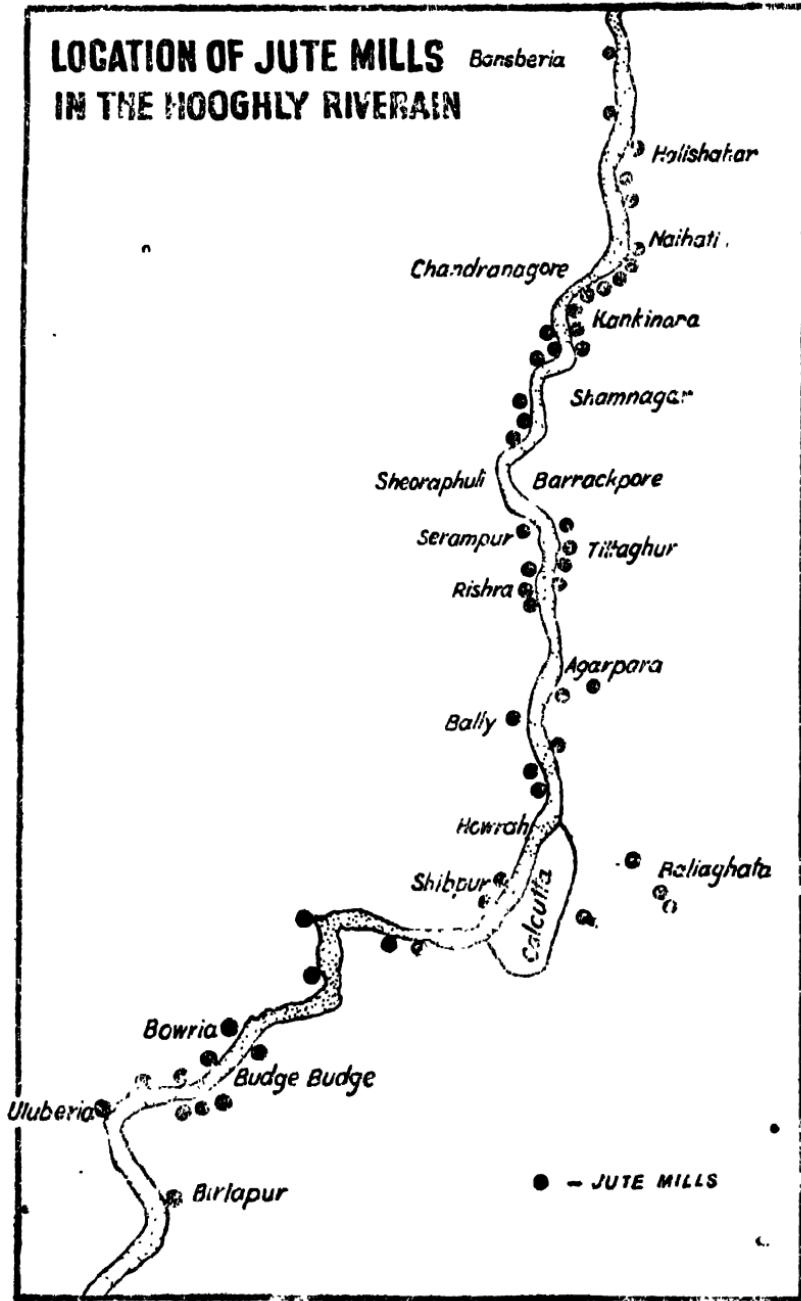
1 R. K. Mukerjee: *The Changing Face of Bengal* (1938), pp. 58-9.
(See Table on p. 77.)

PRODUCTION OF RAW JUTE



N. S. H. BISHT DEL

LOCATION OF JUTE MILLS IN THE HOOGHLY RIVERAIN



achieved anywhere except in Formosa. The total quantity of jute grown outside India may not exceed 40,000 tons per annum or about 2·6 per cent of the total world supplies.

In the province of Bengal the production of jute is concentrated in a comparatively small area and, therefore, East Bengal accounts for nearly 60 per cent of the total production of jute in the whole of India. As nature has confined the cultivation of jute within such narrow limits, economic factors have confined its manufacture within still narrower limits in India. In 1940, 95·5 per cent of the jute looms in India were located in Bengal and all the jute factories containing these looms were situated in a small strip of land about 60 miles long and two miles broad, along both the banks of the Hooghly, above and below Calcutta, from Bansberia (35 miles above the city) to Uluberia (20 miles below) on the north bank of the river and from Halishahar (28 miles above) to Birlapur (22 miles below Calcutta) on the south bank. The notable centres of the industry are: Titagarh (nine mills), Jagatdal (eight mills), Budge-Budge (six mills), the municipalities of Howrah, Salkia and Sibpur (eight mills) and Bhadreswar area (six mills). Within a relatively short time, areas near Calcutta, which for hundreds of years had been devoted entirely to agriculture or fishing, became, with the opening of the jute mills, thriving industrial centres with increasing populations. The average daily number of workers employed in jute mills in this area between 1928-29 and 1938-39 has varied from 3,43,861 to 2,98,520.²

The spinning of jute was carried on by the people of Bengal centuries before the arrival of Europeans in India and the yarn thus spun was used for lines and cordage, for bedding cloth, screens, matting and many other articles of domestic use and for bags for packing grain, sugar, salt and other commodities. The (Footnote 1 contd.)

| Distribution of Rainfall | | | Distribution of Rainfall | | |
|----------------------------|-----------------|----------------|---------------------------|-----------------|----------------|
| Regions of high jute yield | February to May | June to August | Regions of low jute yield | February to May | June to August |
| Dacca | 18·7 | 39 | Burdwan | 9·0 | 33·3 |
| Mymensingh | 24·0 | 47 | Midnapur | 9·6 | 35·4 |
| Tippera | 20·7 | 45·8 | Murshidabad | 8·5 | 33 |
| Faridpur | 17·6 | 37·6 | Dinajpur | 10·0 | 43 |

² Report on Marketing and Transport of Jute (1940), p. 132.

jute industry formed the grand domestic manufacture of all populous eastern districts of lower Bengal and among the peasantry and fisher folk, men, women and children, in every household, found occupation in it.

With the establishment of commercial relations between the European countries and the East Indies jute cloth and bags were exported in quantity in the earlier part of the last century to Java, Borneo and other neighbouring ports and later on a demand for cotton packing cloth and bags also began to appear in America and in the ports of Western India. To meet this entire demand for exports as well as for internal use in India, jute goods were prepared by hand on bamboo and wooden contrivances in the province of Bengal.

But jute, like other textile materials, is a pure fibre and does not lose much in weight in the process of manufacture and hence cannot bind the manufacturing industry to the place of production of raw jute.³ Accordingly, with the success of Dundee flex spinners, who began experimenting with jute about the year 1822, in solving the problem of spinning the jute yarn on modern machinery by batching the jute fibre with whale oil, the jute industry on a factory scale was established at Dundee and by 1838 it was found possible to turn out marketable goods.

That was the time when the newly opened up virgin lands in the U. S. A. and Argentine were beginning to yield fabulous harvests of wheat, corn and cotton and countries like Argentine, South Africa and Australia were beginning to produce enormous quantities of raw wool. Huge cargoes of these food-stuffs and industrial raw materials (cotton, wool, etc.) were moving from the U. S. A., and the southern continents to the populous industrial centres of Western and Central Europe. The Scottish jute industry catered to supply packing cloth and bags for this huge and voluminous trade in cereals, cotton, coffee, wool and similar other raw products and imported raw jute from India for the manufacture of the packing cloth and bags.

³ Dr P. S. Loka Nath holds a different view on this point. In his book on the *Industrial Organization in India* (1935), he writes:

'The jute industry seems, however, to be an exception to the general theory of localization of the textile industries. Its raw material is cheap and it cannot therefore afford much transportation cost.' (p. 64).

India went on undisturbed with her hand-spun jute industry till 1854, when Dundee-made imported jute cloth began to compete with the India-made cotton packing cloth in the Bombay market. It was then that the competition of the machine made cloth from Dundee drew the attention of an early adventurer, George Ackland, who had already started a factory for preparing hand-spun jute goods, to the possibilities of installing spinning machinery for producing similar goods in India. As a result of his enterprise the first Indian jute spinning mill at Rishera was installed in 1855 with a very modest output of eight tons per day and within ten years three or four new mills were added on.

All the circumstances favourable to the establishment of the jute mill industry existed in Bengal. Besides local raw materials, coal for power was obtainable from the coal-fields of Western Bengal and labour familiar with spinning and weaving of jute yarn was also available locally, as Serampore was a noted centre of the native industry in hand-spun jute and sunn-hemp. But in the matter of machinery, technical knowledge and skilled labour just as the Bombay cotton industry was dependent on Lancashire in the early period of its growth, so the Calcutta jute industry was dependent on Dundee. The early European assistants, who arrived in India from Dundee were required not only to undertake the modern white-collar job of directing or supervising but had also to do a great deal of manual work as tinsmiths, blacksmiths, carpenters and turners. These hardy pioneers also taught the Indian workers and artisans spinning and weaving, and the fitting and repairing of the machinery.

The early Calcutta jute mills obtained their raw jute chiefly from the Serajganj market and manufactured goods purely to meet the local demand. There was very little export trade except with Burma. The first attempt in 1868 to ship twills and twill bags to the United Kingdom proved a failure owing to irregularities in weights and counts. But the production, even for the local demand, was so profitable that the number of mills began to increase rapidly, and by 1875 there were nearly 16 mills working in the Calcutta area.

At this stage the increase in the production of jute goods, combined with the spirit and energy of some of the new entrepreneurs, introduced a change in the scope of the consumers' markets. Two mills—Samunuggar and Hastings—played a very

important part in the venture into the foreign markets. Backed by the practical experience and business connexions of the home board in foreign markets, Samunuggar did more than all the other companies put together to invade new markets. These mills proved the ability of the Calcutta industry to compete with Dundee for the 'Frisco hessian wheat bag, and the Australian corn sack, wool-pack and hessian bran bag demand.⁴ The credit of securing a new opening by getting a contract in hessian cloth, burlap for the U. S. A. in 1877 goes to the Hastings Mill.

Increased demand for jute goods on account of the opening up of new markets attracted new mills and 'British capital and expert skill were poured freely into the Calcutta industry owing to the advantage of its location.'⁵ Between 1875 and 1885, the Calcutta agents of the local jute mills, through their foreign connexions, succeeded in winning the colonial and American markets for their goods from the Dundee mills. By the end of this period, regular orders were being received from Great Britain for twills, flour bags and salt bags. Besides these, the Egyptian Daira contracts, Levant orders for grain sacks, the whole of colonial corn sack supply and a fair share of the supply of wool-packs were secured. The market for nitrate bags in Chile was opened up in 1889 and orders for cloth from Argentine and for sugar bags from Cuba were obtained in 1896.

It appears strange that in spite of all this progress and prosperity of the jute industry 'the Bengalee or indeed Indian capitalists took very little part, otherwise than as mere investors, in the starting, and none at all in the management⁶ of the mills' till about twenty years ago. The nature of the markets (predominantly foreign) and the development of non-Indian business agencies and financial institutions in Calcutta were mainly responsible for this state of affairs. The new foreign units could succeed in jute because, with the help of their foreign agencies and links, they could manage to find out fresh openings for their manufactures in the overseas markets. But Indians, on the other hand, had no such connexions to push their goods. Some of the difficulties of Indian businessmen and entrepreneurs were placed before the Indian Fiscal Commission by the Bengal National Chamber of Commerce and the Marwari Association, Calcutta.

⁴ D. R. Wallace: *The Romance of Jute*, (1928), pp. 36-37.

⁵ Report of the Indian Industrial Commission (1916-18), p. 15.

⁶ *Ibid.*, p. 15.

The Bengal National Chamber of Commerce complained against the unfair treatment meted out to Indian businessmen by Scottish managed jute mills, European jute brokers and the British inland steamer companies. It was asserted that Indian steamer companies were denied even insurance facilities for their jute consignments by European insurance interests.⁷ The representatives of the Marwari Association in their evidence before the Commission stated: 'It is notorious that the banks give undue preference to European merchants and companies under European management to the exclusion of Indians. By reason of such financial assistance, as also by reason of the fact that buyers and sellers in the U.K. and other parts of British dominions give undue preference to exporting and importing European firms in this country, Indian merchants are very much handicapped in the race. Furthermore, although Indians hold not less than 60 per cent of the shares in the companies owning the jute mills, European Managing Agents thereof do not buy jute through Indian brokers but do so through European brokers even on payment of, say, annas 8 more per maund. At the time of selling the finished product again, most of the Managing Agents refuse to sell even to those Indians with whom they do not consider there is any risk in dealing in the course of their other business, including the business in jute products. They sell even to Japanese in preference to Indians.'⁸ Even assuming that the grievances of the Indian business community might have been slightly exaggerated, there is little reason to disbelieve the main trend of the complaint when we see that the jute industry taken as a whole is dominated by the Europeans even to this day.

The recital of some of these historical details of the development of the jute industry has been necessary to illustrate clearly the nature of the markets supplied by the jute mill industry of Calcutta. It is evident that the home market in India for the products of the local jute mill industry ceased to be of any considerable importance in the very early years of its growth and that it developed mainly as an exporting industry. The internal consumption of the jute goods manufactured in Bengal

⁷ Minutes of Evidence recorded by the Indian Fiscal Commission (1923), Vol. I, p. 410.

⁸ *Ibid.*, p. 419.

is not of any considerable importance even to this time.⁹ Thus the Bengal jute industry producing goods for the overseas colonial markets resembles very closely the early cotton mill industry of Bombay, which produced yarn for the China market. Being almost entirely dependent on the foreign markets, it is but natural that most of the mills should be concentrated in an area as near to Calcutta as possible, in order to be in the most advantageous position to export their manufactures.

But such unusual concentration of the industry in a very limited area in the Hooghly riverain cannot be explained with reference to the nature of the markets only. The distribution of the production of raw jute fibre as well as the nature of the means of communication serving these areas have also played a decisive part in determining the location of the jute industry. The distribution of cultivation of raw jute is as follows:

TABLE XIX
Percentage of Acreage of jute cultivation¹⁰

| Province | 1935-6 | 1936-7 | 1937- | 1938-9 |
|---------------|--------|--------|-------|--------|
| Bengal | 87 | 77 | 75 | 78 |
| Bihar | 6 | 16 | 15 | 10 |
| Assam | 5 | 5 | 8 | 10 |
| Orissa | 1 | 1 | 1 | 1 |
| Indian States | 1 | 1 | 1 | 1 |
| | 100 | 100 | 100 | 100 |

It will be seen from the table given above that more than four-fifths of the jute acreage lies in Bengal; the major portion of the remaining area lies in the provinces of Bihar, Assam and Orissa in the districts adjacent to Bengal.

| | 1936-37 | 1937-38 | 1938-39 |
|--|-----------|-----------|----------------------|
| 9 1. Jute goods produced in India (tons) | 12,53,113 | 13,11,658 | 12,11,482 (p. 93) |
| 2. Quantity of gunny bags and cloth delivered from Calcutta mills for local and up-country markets (tons) | 69,948 | 81,931 | 1,16,373 |
| 3. Item No. 2 expressed as per- centage of item No. 1 | 5.6 | 6.2 | 9.5 (p. 109) |

(From the Report on the Marketing of Jute and Jute Products: Second Report, 1941).

¹⁰ Report on the Marketing and Transport of Jute (1940), p. 6.

In most of these jute producing areas, carriage by water is the main and cheapest form of transport. The importance of this form of transport is best illustrated by the following tables:

TABLE XX

Arrivals of jute into secondary markets by various means of transport (1937-38)¹¹

| Means of transport | Percentages | | | | | | Average cost per mile per maund | |
|--------------------|-------------|-------|------|-------|-------|--------|---------------------------------|--|
| | Bengal | | | Bihar | Assam | Orissa | | |
| | East | North | West | | | | | |
| Boats | 85 | 15 | 5 | 10 | 45 | 39 | 1.9 pies | |
| Carts | 5 | 85 | 95 | 90 | 45 | 52 | 3.0 " | |
| Pack animals | 5 | ... | ... | ... | ... | ... | 4.4 " | |
| Head loads | 5 | ... | ... | ... | 10 | 9 | 8.2 " | |
| | 100 | 100 | 100 | 100 | 100 | 100 | | |

TABLE XXI

*Arrivals of jute into Calcutta by various means of transport
(Average for 5 years from 1934-35 to 1938-39)¹²*

Steamer services: 52 per cent Country boats: 3 per cent
Railways: • 43 per cent Bullock carts: 2 per cent

The means of transport used for moving jute from the primary to the secondary markets and again from these to Calcutta show that carriage by water is the most important form of transport utilized for jute during all the stages from the fields to the factories. And again the rivers Ganges, Brahmaputra, and Meghna, along with their subsidiary channels, tributaries, and distributaries, which provide the waterways in Bengal and Assam for all the steamer and boat services, converge towards the head of the Bay of Bengal and finally enter the sea through a common delta. Owing to this drawback, there is only one seaport—Calcutta—to serve this vast area and even in the case of this port

¹¹ Report on the Marketing and Transport of Jute (1940), p. 137.

¹² *Ibid.*, p. 138.

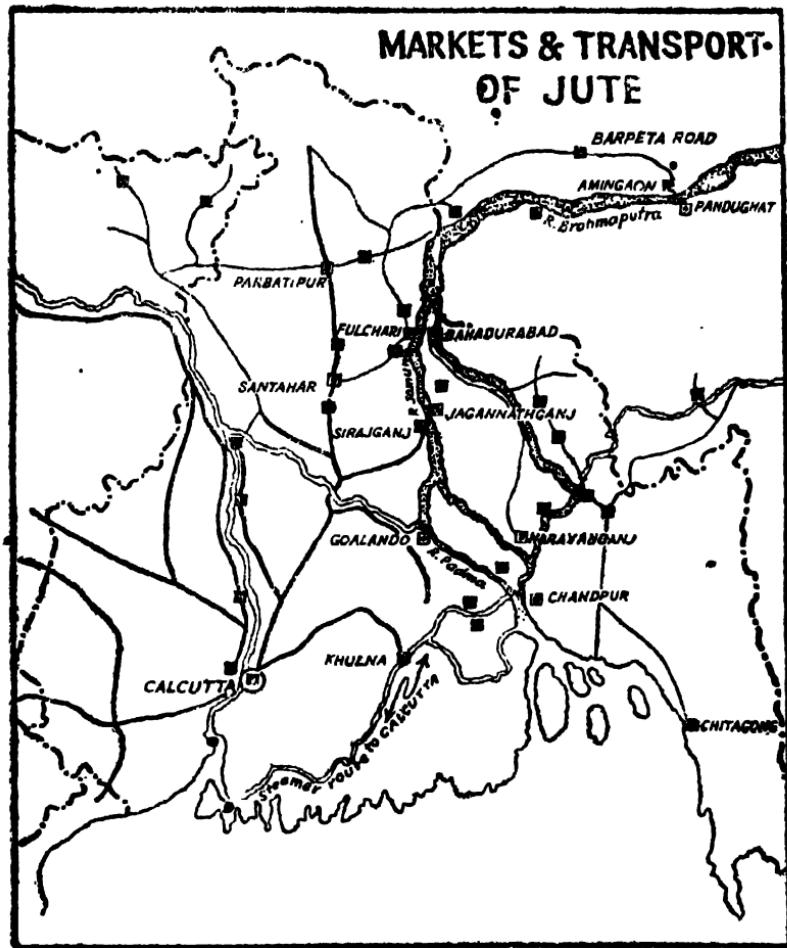
the depth of the river Hooghly, on which it is situated, has to be maintained by artificial means. In these circumstances any industry proposing to manufacture goods for export overseas and at the same time anxious to obtain a good supply of raw jute, cannot find a better location than a site somewhere on the banks of the Hooghly.

There is yet another question to be answered. We have already seen that the cotton industry is moving from the west coast of India to the cotton belts in the interior. But how is it that a similar movement has not taken place in the case of the jute industry? A majority of the mills remains centred around Calcutta and not a single mill has been so far established in the main jute belt in Eastern Bengal. The answer to this question also is to be found in the nature of the means of communication. The Indian jute mills purchase most of their requirements of raw jute from the East Bengal area, i.e. Mymensingh, Dacca, Tippera and Faridpur. In all about 70 per cent¹³ of the total purchases of the mills are of this class of jute, the balance being made up of North Bengal, Assam, Bihar and Desi qualities. Of the four districts mentioned above, the first three districts, which supply the major portion of raw jute to the Indian mills, lie on the opposite bank of the river Brahmaputra which is unbridged, and the transport across this river involves the problem of transhipment. The jute moving to Calcutta on the Dacca section of the E. B. Ry. has to be transferred to flats either at Jagannathganj or Narayanganj and loaded on wagons again on E. B. Ry. (broad gauge) at Serajganj and Khulna respectively. The fibre brought from Nowgong in Assam on A. B. Ry. is loaded in flats at Pandughat and ferried across Brahmaputra to Amiangaon to be loaded on meter gauge wagons to Parbatipur, where it is reloaded on broad gauge wagons to Calcutta. Between Bahadurabad and Fulchari there is a wagon ferry service, but even this jute has to be re-loaded on broad gauge wagons at Santahar. In the case of combined steamer and railway services, transhipment takes place between Narayanganj and Khulna, Narayanganj and Goalundo, Jagannathganj and Serajganj, and between Chandpur and Khulna.

Under these conditions of transport, involving a good deal of terminal charges, if the jute mills were located in the main jute belt in Eastern Bengal, the transhipment hurdles would have to be crossed twice—once in moving the coal, mill stores, labour,

¹³ Report on the Marketing and Transport of Jute (1940), p. 244.

MARKETS & TRANSPORT. OF JUTE



N.S.H. 815NT DEL.

Secondary market of raw Jute . . . ■

Transhipment points - - - - - ■

Manufacturing & Exporting centre. ◎

etc. to the mills and again in moving the finished goods to Calcutta for export to consumers' markets overseas and in other parts of India. But in the case of mills in the Hooghly area the transhipment ordeal has to be faced only once—in moving the raw jute to the mills. Thus the location of the Indian jute mills around Calcutta in the Hooghly riverain has proved to be the only right course.

Although the major portion of the Indian jute mill industry is located in Bengal, a few mills have been set up in some of the neighbouring provinces to take advantage of local raw materials and markets. The extension of the industry in the provinces of Bihar, the U. P., and the C. P. is mainly due to the creation of new markets in these provinces by the demand for bags from new industries like sugar, flour and cement.

The distribution of jute looms in India in 1940 was as follows:

TABLE XXII

| Province | No. of looms | Percentage of the all-India total |
|----------|--------------|-----------------------------------|
| Bengal | 65,521 | 95.5 |
| Bihar | 1,144 | 1.7 |
| Madras | 991 | 1.4 |
| U. P. | 870 | 1.2 |
| C. P. | 150 | 0.2 |
| Total | 68,676 | 100 |

The strictly restricted nature of its source of supply, and the absence of really good and effective substitutes, have enabled the jute fibre and its manufactures to command a fairly stable market even in the most distant parts of the world. The total quantity of raw jute disposed of is given in TABLE XXIII opposite.

It is remarkable that raw jute goes only to highly industrialized countries which utilize it for a number of industrial purposes. The most important overseas section of the jute industry as mentioned earlier is located at Dundee. It was this section of the industry which, before the establishment of the jute mill industry in India, supplied jute cloth and bags for an extensive trade in cereals, wool, cloth, etc. between the agricultural and

TABLE XXIII
Total quantity of raw jute consumption
 Average for 10 years (1929-30 to 1938-39)

| | | (000's bales) | Percentage |
|--------------------|-----|---------------|------------|
| Total production | ... | 9,923 | |
| Indian consumption | ... | 5,945 | 59.9 |
| Exports overseas | ... | 3,978 | 40.1 |

Details of Indian consumption

| | | |
|-------------------------|-------|------|
| Probable mill purchases | 5,647 | 56.9 |
| Village consumption | 298 | 3.0 |

Details of exports

| Destination | | Percentage of the total |
|-------------|-----|----------------------------|
| U. K. | ... | 22.2 |
| Germany | ... | 21.4 |
| France | ... | 11.0 |
| U. S. A. | ... | 8.7 |
| Italy | ... | 8.1 |
| Belgium | ... | 7.1 |
| Others | ... | 21.4 |

pastoral countries of the southern continents and the highly industrialized countries of Europe.

The jute industry in India was more favourably placed than the Scottish section from the point of view of its situation in relation to markets in Australia and some other parts of Asia. Later on with the installation of up-to-date machinery, erection of better planned buildings and development of a class of skilled workers, Indian jute industry could meet the requirements of ordinary jute cloth and bags in most of the colonial markets on better terms than the Scottish industry could, while the colonies being industrially backward were not in a position to develop a jute industry of their own which could affect the markets of the Indian industry.

Unable to compete with the Indian industry in the ordinary lines of jute goods, the Dundee manufacturers busied themselves with exploring fresh avenues for the use of jute fibre and considerable new developments took place immediately before as well

as after the Great War of 1914-18. The possibilities of bleaching and water-proofing jute fabrics led to the manufacture of tarpaulins and canvas. The technique of using jute yarn in combination with cotton and wool was also perfected and curtains, upholstery fabrics, carpets, even dress materials made wholly or partially of jute, are attaining increasing popularity.

Dundee has now taken to these new lines of the manufacture of finer fabrics, which are more in demand in the markets of Western Countries and in which the competition from the Indian industry, which still concentrates largely on the production of ordinary classes of hessian and sacking, is practically non-existent.

For the manufacture of these fine types of hessians and tarpaulins as well as for the special types of materials like upholstery fabrics, where the jute yarn is blended with that of cotton, flex, silk or other staples, some of the finest class of jute obtainable in India is imported by Dundee. This superior class of jute which does not amount to more than 10 per cent of the total shipments is almost wholly exported out of India.¹⁴ Nearly 55 to 65 per cent of the exports of jute to foreign countries consists of Desi (mainly grown in Burdwan and Presidency divisions and southern portions of Rajshahi), Northern and Western Bihar jute and the rest is made up of East Bengal and Assam fibre.

It can now be stated that although the production of raw jute remains a close monopoly of India, particularly Bengal, the industrial use of the fibre has become world-wide. Indian mills devote themselves to the manufacture of ordinary jute cloth and bags to supply the needs of agricultural and pastoral countries, mostly situated in the southern hemisphere, which are yet industrially backward, while the Dundee mills manufacture special class of articles from superior fibre for use in the industrial countries of the West. The relationship between the Dundee and Calcutta sections of the jute industry, regarding coarse and fine types of goods is exactly the same as between the Lancashire and Bombay sections of the cotton industry. The Indian sections of both the industries mainly prepare coarse goods, while the British sections manufacture the finer types.

Besides Britain, most of the important countries of Europe and America possess their own industries which consume the fibre obtained from Bengal. TABLE XXIV opposite gives the

¹⁴ Report on the Marketing and Transport of Jute (1940), p. 243.

TABLE XXIV

World distribution of the jute industry¹⁵

| Country | No. of looms | Percentage of the world total |
|----------------------|--------------|-------------------------------|
| India | 68,416 * | 57.0 |
| Germany | 9,600 | 8.0 |
| Britain | 8,500 | 7.1 |
| France | 7,000 | 5.8 |
| South America | 6,000 | 5.0 |
| Italy | 5,000 | 4.1 |
| Belgium | 3,000 | 2.5 |
| North America | 2,750 | 2.3 |
| Czechoslovakia | 2,000 | 1.7 |
| Poland | 1,600 | 1.3 |
| Japan | 1,500 | 1.2 |
| Austria | 1,100 | 1.0 |
| Russia | 1,000 | 0.8 |
| Spain | 800 | 0.6 |
| China | 400 | |
| Yugoslavia | 400 | |
| Sweden | 300 | |
| Estonia | 230 | |
| Canada and Australia | 200 | 1.6 |
| Norway | 100 | |
| Bulgaria | 100 | |
| Finland | 75 | |

* excluding special looms.

estimated total number of looms used for jute manufactures in the various countries of the world.

After the Great War of 1914-18 the difficulties experienced by a number of countries, owing to their inability to obtain the requisite supplies of jute goods in abnormal times, have impelled them to find out alternatives and substitutes. Americans, in particular, have been trying to replace jute by cotton for their burlap requirements. In 1938 the U. S. Government materially assisted its manufacture by giving a subsidy in the form of paying the market price difference between jute and cotton bale

¹⁵ Report on the Marketing of Jute and Jute Products (1940), p. 17.

covers; and on account of surplus stocks of cotton in the States there are indisputable indications of the danger to jute trade from this direction. Rosella bags for packing sugar in Java, kenaf bags for packing rice and soya bean crops in China and Manchukuo, sisal in Italy, and non-fibrous materials like kraft papier in Europe, South America and Australia are certain other competitors of jute. Besides these, the system of bulk handling of grain in Argentine, the U.S.A., Canada, Brazil, Australia, South Africa, and Soviet Russia, has resulted in reducing the off-take of jute bags from India to a considerable extent.¹⁶

These considerations led the Bengal Jute Enquiry Committee (1940) to emphasize the necessity of the adoption by the Indian jute mills, for safeguarding their position in future, of the following new lines of manufactures and suggested new uses of the jute fibre:¹⁷

- (1) In housing—heat insulation, plastic furniture, carpets and curtains, upholstery, blankets and wall coverings.
- (2) In transport—Car upholstery, waterproof covers, tarpaulins, canvas, fire, water and rat proof materials, cordage and ropes.
- (3) In industry—electric insulation, plastic reinforcements.
- (4) In clothes—mercerized and bleached fibres and their blending with wool and cotton.

Some of the new types of goods like rugs and carpets (in mixed colours), waterproof cloth, roofing fabrics, linoleum hessian and union fabrics (composed of cotton warp and jute weft for portable water tank, anti-gas caps, tarpaulins, and carriers of several types for the army) are already being manufactured in the Calcutta mills and experiments have also been carried out on the cottonizing of jute and in the production of fine jute and woollen blankets.¹⁸ Besides these, it is not perhaps too much to expect that the poor tensile strength of the delignified jute fibre will possibly be increased sufficiently by incorporating artificial plastics and jute will then be available for making garments for our use.¹⁹

At the present time both the agricultural as well as manufacturing sides of the jute industry are experiencing great difficulties.

¹⁶ Report on the Marketing of Jute Products (1941), pp. 132-6.

¹⁷ Report of the Bengal Jute Enquiry Committee (1940), p. 19.

¹⁸ Report on the Marketing of Jute and Jute Products (1941), pp. 73-4.

¹⁹ Indian Textile Journal, June 1942, p. 249.

Owing to the lack of shipping space, war embargoes and blockades, the export demand for raw jute has decreased so much that the Government of Bengal is trying to reduce the acreage of jute and owing to the requisitioning of a number of mills by military authorities and the scarcity of coal the manufacturing side is also not doing well. Of the war orders of the Allied governments, the major portion is American, which has been accepted by the industry on the terms practically dictated by the Government of the U. S. A. and as such leaves very little margin of profit to the industry under the existing inflationary conditions in India.

As regards the future it is just possible that in the post-war period the Indian jute industry may find itself in circumstances considerably altered and may be called upon to make adjustments both in agricultural as well as industrial output. But so far as the location of the jute mills in Bengal is concerned, it is very unlikely that the monopolistic position of the Hooghly area will ever be seriously threatened.

CHAPTER VI

FACTORS GOVERNING THE DISTRIBUTION OF IRON AND STEEL INDUSTRY

In the production of iron and steel several raw materials are required, the chief being, in order of importance, iron ore, coal, and limestone. Besides these, modifying metals and refractory materials are some of the other requirements. Iron ore and coal are both bulky materials and are more difficult to transport than the finished product—steel. And as both iron ore and coal are weight-losing materials, the iron and steel industry has a tendency towards 'raw material localization'. Large-scale cheaply worked deposits of iron and coal do not generally occur in close proximity and, therefore, the rival attractions of iron, coal and the markets play their part in the choice of the site for the location of steel works. The more relatively costly the transportation of iron ore, coal, and steel, and the greater the consequent attraction of the ore mine, the coal mine or the market, and the closer will the industry come to the least costly site.

After taking into account the costs of transport of iron ore and coal and the cost of the transport of finished steel to the market a 'point of minimum transportation costs' will be chosen as the site of the manufacture of steel. Taking points I, C, and M as iron ore mines, coal mines and the steel markets respectively, point 'S' may be the 'point of minimum transportation costs' and hence the site most suitable for locating the steel works for manufacturing steel from these particular resources. Sometimes the loading and unloading charges at both the ends are so heavy that two short journeys cost more than a single long one and therefore the lowest transportation costs may be obtained by locating the steel works in one of the raw material centres, generally in the coal district.

In this case ore goes to the coal, not only because the ore is comparatively less weight-losing material than coal but on account of the fact that actually the field so frequently has other industries for which the iron and steel is a raw material. In other words the coal-field provides a ready market for the products of the iron and steel industry just in the vicinity of the steel works. Leaving this consideration of the markets for steel at the coal-

fields, the coal no longer has the stronger pull on the industry than the ore because today the efficiency of the blast furnace is such that in countries where coal of good quality is available, more than one ton of coke is seldom required for smelting one ton of metal.

In countries like the United States of America and the United Kingdom where the industrialization, mechanization of industry (including agriculture), and development and co-ordination of the various means of transport have all reached an advanced stage, the attraction of iron and steel markets is, in certain cases, becoming stronger than that of either the ore or the coal mine, and in such cases the iron and steel industry is becoming 'market localized'. The best example of such localization is furnished by the steel industry of Calumet District (Lake Michigan) where the iron ore is obtained from the Lake Superior region and the coal comes from Virginia and Pennsylvania. The iron and steel industry is located in the district mainly to take advantage of the concentrated iron and steel market in this region. The greatest railway works in the world as well as the works of the International Harvester Trust Corporation are situated in this region at Chicago. Besides labour-saving machinery...automobiles and steel rails, wire for fencing, tin-plate for canning, structural steel for buildings, wire-mesh for highway foundations, piping for gas, water, heating, sanitation and oil are required for the development of the western States of the U.S.A. It is the attraction of this great iron and steel market that has drawn the industry to this region away from both the iron and the coal mines.

Besides this two or three other examples of different types of location are furnished by the iron and steel industry of the United States of America. In the Pittsburg area the ore moves to the coal; in the Lake Superior region at Duluth the coal goes to the ore; and in the Lake Erie region the industry has sprung up at the meeting point of the two—the iron ore and the coal. Here the iron ore from the Lake Superior region comes ashore and the coal from the Appalachian region goes afloat. The industry in the Lake Erie region is an example of 'break-localization' and has come to be established there to avoid terminal charges both on iron ore and coal as well as to take advantage of the adjacent steel market in the West just near at hand. The rather unusual location of the industry at Duluth, near the ore mines has also been partly influenced by rapidly

growing demand for iron and steel goods in the western regions, although a cheap fill-up cargo coal on the return run of the iron and the wheat ships moving from the head of the Lake Superior region to the Erie ports is mainly responsible for the establishment of the iron and steel industry there.

Another important factor responsible for the development of a tendency towards market-localization of the iron and steel industry, in preference to raw-material localization in the U.S.A., is the change in the scope of utilization of coal. In the important industrial regions of this country there is a tendency towards the utmost utilization of the by-products of coal. The gas, besides other by-products obtained in the process of preparing coke, is used for a number of purposes. One half of the gas is used in heating ovens, one-third in steel and other related plants, and one-tenth for lighting and heating in the adjacent towns. On account of this development the coking industry itself is shifting from the coal-fields to the industrial areas of the Lake shore regions, where it assists the development of the iron and steel works nearer to the steel markets.

In India, however, there are no such unusual factors. The heavy basic industries like ship-building, automobiles, etc. are practically non-existent even today and therefore the development of the modern iron and steel industry of India has followed more or less the old and orthodox lines in the matter of location in relation to its component units. The location has been influenced more by the considerations of transport costs of iron ore and coal than by those of the markets which in India are of a diffused nature.

The most important iron ore deposits of India are given in TABLE XXV opposite.

It will be seen from this table that the Hematite ores of the 'Iron-Belt' of Bihar and Orissa are the most important and the richest of all the Indian ore deposits. These ore bodies extend from Gurumahisani Hills in the Mayurbhanj State westwards through the Keonjhar and Bonai States to the sub-division of Kolhan in the Singhbhum district of Bihar. The distribution and composition of these ores are given in TABLE XXVI opposite.

According to the calculations of Mr E. Parson, the quantity of ores of the proved quality of 60 per cent in the same area was not less than 30,000 lakh tons, while Mr C. P. Perin, the American expert engaged by Mr J. N. Tata, went so far as to say that in the

TABLE XXV
Iron ore deposits of India

| Type | Region or districts where located | Reserves | Iron content (percentage) |
|-----------------|---|--|---------------------------|
| Magnetite | Salem (Madras Province) | No precise figures. The total quantity of ore available is considered to be practically inexhaustible. | 55 |
| Laterite | Rajmahal Hills (Bengal Province) | Large | 43 |
| | Jabbulpore (Central Province) | 490 lakh tons | 53 |
| Clay Iron Stone | Raniganj (Bengal Province) | At least 4000 lakh tons | 38 to 46 |
| Hematite | 'Iron-Belt' (Provinces of Bihar and Orissa) | 28,000 lakh tons | 60 to 68 |
| | Chanda (C. P.) | At least 1000 lakh tons | 61 to 67 |
| | Drug (C. P.) | 100 lakh tons | 66 |
| | Bababudan Hills (Mysore State) | 250 to 600 lakh tons | 42 to 64.5 |
| | Kumaon (U. P.) | Not known | 39 to 60 |

TABLE XXVI
The distribution and composition of the 'Iron-belt' ores¹

| Distribution of deposits | Reserves (lakh tons) | Composition (percentage) | Remarks |
|--------------------------|----------------------|--------------------------|--|
| Mayurbhanj | 160 | Fe 60 P Traces S | Average |
| Bonai & Keonjhar | 2,800 | to 0.08 to 0.6 | Kolhan ore 64 per cent iron, 0.05 per cent manganese dioxide, 2.1 per cent silicon, 0.05 per cent phosphorus, 0.002 per cent sulphur, 0.15 per cent lime, 0.18 per cent Magnesia, 1.25 per cent Alumina. |
| Bonai Singhbhum | 6,560 | 68 | |
| Keonjhar | 10,740 | | |
| | 8,060 | | |
| | 28,320 | | |

(Footnote 1 see overleaf).

quadrangle, 400 miles east to west by 200 miles north to south (with Calcutta at the north-east corner) there were some 200,000 lakh tons of high grade ore at an average distance of 125 miles from the Bengal coal-fields.

These ores are estimated to be sufficient for a thousand years with a pig iron output of 15 lakh tons annually. From the qualitative point of view, with an iron content often ranging up to 68 per cent or more they occupy a very high position in the world. Apart from this high metal percentage, these ores are also notable for their lower sulphur content which never rises above 0.6 per cent. Both in quality and quantity these ores are regarded as superior even to the great American occurrences of Minnesota, Wisconsin and Michigan.¹

According to latest estimate the total coal reserves of India may be placed at 6,00,000 lakh tons. But the distribution of the coal-fields is very uneven. Most of the important deposits of Gondwana (Permian) coals are found in a belt running from the

1 Estimates of Dr Fox appended to the Report to the Indian Tariff Board on Iron and Steel, 1924. The latest estimates of the Department of the Geological Survey of India are as follows:

| | | |
|------------|----------------------|---------------------------------------|
| Sikhhum, | 10,470 (lakh tons) | Average Kolhan ore 64 per cent |
| Keonjhar | 9,880 (") | Iron. Better parts 68 to 69 per cent. |
| Bonai | 6,480 (") | |
| Mayurbhanj | 180 (") | |
| Total | <u>27,010 (")</u> | |

(Records of the Geological Survey of India, Vol. LXX, 1936, p. 143.)

2 The composition of some of the best ores of the world is as follows:

1. The average composition of the Lake Superior ores is Iron 58.45 per cent, Phosphorus 0.091 per cent Silica 7.67 per cent, Alumina 2.23 per cent, Manganese 0.71 per cent, Lime 0.54 per cent, Magnesia 0.55 per cent, Sulphur 0.06 per cent (R. Van Hise and C. H. Leith).
2. The average percentage of Iron in the famous Magnetite deposits of Kiruna, Northern Sweden, is 68 per cent. Phosphorus is as a rule, above 2 per cent, (variable from 0.05 to 4.5 per cent). Sulphur is not above 0.05 per cent, Manganese not above 0.70 per cent, a similar amount of Magnesia is recorded, about 1.5 per cent Silica, 0.75 per cent Alumina, about 3 per cent Lime and 0.3 per cent Titania (W. Lindgren).
3. The composition of the ordinary brown Hematite ore ('Bubio' type) of Bilbao deposits, Spain, is 48 to 58 per cent Iron, 0.5 to 2 per cent Manganese, 0.5 to 2 per cent Lime, 2.5 to 14 per cent Silica and traces to 0.9 per cent Phosphorus (Imper. Inst. Bur. Iron Ores).

Central Province to the borders of the Province of Bengal. The only important reserves lying outside this area are those of Eocene (Tertiary) coals of Assam, which on account of their pyritic sulphur content are unsuitable for metallurgical purposes. Even of the Gondwana coals only about 23,990 lakh tons may be regarded as suitable for the preparation of the metallurgical coke for iron-smelting and steel-making.³

Even good quality Indian coals are inferior to average British coal. Judged by European and American standards the coking coals of India appear to be characteristically high in phosphorus and moderately high in ash. The phosphorus in coal finds its way into pig iron and necessitates the adoption of a relatively more expensive basic process in the production of steel. But the cheapness of the Indian coal counterbalances the disadvantage. According to our present knowledge, the best coking coals of India are in the Giridih and Jharia fields.⁴ A proportion of the Giridih coal is of extra special quality due to its very low phosphorus content.⁵

Thus under normal conditions the distribution of iron ore and coal, the two most important raw materials used by the iron and steel industry, is favourable for the location of this industry in the region lying between the iron-belt and the Bengal coal-fields. Naturally the works of both the Tata Iron & Steel Company and the Steel Corporation of Bengal (along with the iron works of the Indian Iron & Steel Company) are located in this region.

³ Estimates given in the letter dated January 12, 1924, from Dr Pascoe, Director, Geological Survey of India, to the Indian Tariff Board on Iron and Steel Industry. •

⁴ The existing iron and steel companies have secured control of substantial sections of the Jharia coal-field and in their case there may not be an appreciable shortage of metallurgical coke for a few generations, but with the exception of these reserved portions, the remaining Jharia coking coals may be exhausted at the end of 33 years (from 1932), unless there is an improvement in the mining practice. The iron and steel industry will then have to rely upon Bokaro coal and admixture of Bokaro coal with such Raniganj coals as are available and perhaps with semi-coking coals from Karnapura coal-fields. And as the total supplies of good coking coal appear to be inadequate vis-a-vis the supplies of iron ore, it is very necessary that

possible steps should be taken to conserve the coking coal deposits in Jharia and Raniganj coal-fields (specially the Disheragarh seam at present being utilized for steam raising by railways).

⁵ Sir L. L. Fermour, Director, Geological Survey of India: *India's Coal Resources* (1935), p. 8.

The Tata Iron & Steel Works at Jamshedpur obtain the supplies of their iron ore from Gurumahisani, Okampad, Badampahar and Noamundi deposits, while the works of the Indian Iron & Steel Company (situated at Hirapur and Kulti), now supplying pig iron to the steel works of the Steel Corporation of Bengal at Napuria get their ores from Gua mines situated in the hill masses known as Notu Buru and Budu Buru. Both of them depend upon the Bengal coal-fields for the supply of their coking coal.

The story of the search for a site for the iron and steel works carried on by Mr J. N. Tata and his successors is unparalleled in the history of the location of the Indian industries and illustrates the practical force of the theoretical localizing factors so well that it will not be out of place to narrate it very briefly.

Mr J. N. Tata, while supervising the Empress Mills at Nagpur, came across a government report on the financial prospects of iron working in Chanda district (C. P.) by Ritter Von Schwarz, a German expert, and conceived the idea of starting a modern iron and steel works in India. On the advice of Mr Julian Kennedy of Pittsburg, one of the foremost metallurgical engineers of the world, he engaged the services of Mr Charles Page Perin, an eminent consulting engineer of New York, for a very thorough and scientific survey and investigation of the local conditions, raw materials and markets of India. Mr Perin sent his associate Mr C. M. Weld to undertake the work in India immediately. After conducting a minute examination of the area, Mr Weld came to the conclusion that on account of the difficulties of coal, the Chanda deposits did not offer any hopeful chances of starting the iron works there.

At this stage when Mr Dorabji Tata, accompanied by Mr Weld, went to Nagpur to inform the Government of their decision, he came across a geological record of the Drug district (C. P.), prepared by Mr P. N. Bose of the Geological Survey of India, who had gone through the district looking for iron, and found a specimen of the ore in the local museum. They decided to investigate the ores of the Drug district and were astonished to find a hill, 300 ft. high, which consisted of almost solid iron. A discovery more striking than this has never been made in the whole history of the iron industry. The results of analysis showed that the ore carried from 65.5 per cent to 70 per cent iron. Later on Mr Perin declared the ores to be one of the mineral wonders of the world.

The ores of the Drug district were excellent but the coking trials made with Warora coal in England gave no satisfactory results and after a long and careful survey of the Jharia and Raniganj coal-fields Mr Weld came to the conclusion that the only suitable coking coal in India could be obtained from the Jharia coal-fields in Bengal. The smelting trials of Drug ores with the coke obtained from Jharia coal carried out in Germany and America were found to be highly satisfactory. The coal could be brought from Bengal but the Central Province could not provide a large and constant supply of water to cool the great furnaces and this question of water supply led the investigators from the C. P. to Padampur, near Sambalpur (now in the Province of Orissa), a town situated on the river Mahanadi. From the point of view of transport relations, this site was midway between the Drug ore deposits and the Jharia coal-fields.

At this stage Mr P. N. Bose intervened personally and in the words of Sir L. L. Fermour, the Director of Geological Survey of India, 'prevented the site of the works from being established in a wrong place from the operating point of view.'⁶ Mr Bose led the prospectors to ores, equally rich but more favourably located in the Mayurbhanj State. Messrs Weld and Perin found in the lofty Gurumahisani Hill, which rises to a height of 3000 ft., enormous deposits of iron ore, quite as extensive as those in the Drug district, not so compact and not quite so rich but more favourably situated. There were hundreds of acres of rich ore-float—ore lying loose on the surface—which required no mining and simply had to be picked by unskilled labour.

After some statistical calculations regarding the relative cost of production from both the sources of ores, Messrs Tata and Sons decided to use the Mayurbhanj ores. It was a very important decision, because otherwise 'the steel works at Jamshedpur would have been situated today at a place much farther removed from the coal-fields and the port of Calcutta.'

•The credit for the continuation of the quest and subsequent right choice of a site for the steel works, which opened an interesting and new chapter in the history of iron industry in India

— 6 Extract from the speech delivered at the ceremony of unveiling the bust of Mr Bose at Jamshedpur, March 1938.

7 Extract from the speech of Mr (now Sir) Ardeshir Dalal, the chief representative of the Tatas at the ceremony of unveiling the bust of Mr Bose at Jamshedpur.

on modern lines, goes to Mr Pramatha Nath Bose. Mr F. R. Harris, the chronicler of Mr J. N. Tata, rightly observes : 'In the industrial development of India Mr Bose is assured of a permanent mention. His enquiries were the prelude to the discoveries of Mr Weld in the Drug area and he.....pointed out the way to still more promising results. • His work is one more refutation of the current criticism of Bentgialis on the supposed ground that they are not practical men.'

After this discovery of Mayurbhanj ores the site at Padampur was given up in favour of Sini, a small station on the B. N. Ry. about 60 miles north-west of Gurumahisani Hill. Even this site was later on given up in favour of Sakchi, afterwards renamed Jamshedpur in memory of the late Mr Jamshedji N. Tata. The main reason for this change from Sini to Sakchi at that time was the lack of sufficient land of a suitable type. But afterwards Sakchi was found to possess a number of additional advantages. It shortened the distance to Calcutta as Kalimati (now Tatanagar) station was only 152 miles from Calcutta, while Sini was 171 miles. Ample land of a suitable type, underlain by mica schist, affording good foundations for the new works was available. The adjoining rivers Khorkai and Subaranrekha, which have never been known to run dry assured an unfailing water supply while the stream near Sini had a good flow only for four months in the year. Sakchi was also a little nearer to the ore-fields than Sini. The first stake was driven at Sakchi on February 27, 1908 and the first iron was made on December 2, 1911. • Thus the quest that was started in Chanda district in the very heart of the sub-continent of India bore fruit at a distance of only 152 miles from Calcutta—the main eastern seaport of India.

For starting heavy industries, like iron and steel, finance is also a very important consideration, as a very large amount of capital is required for establishing a modern iron and steel works. Messrs Dorabji Tata and B. J. Padshah tried in vain to obtain most of the finance for their scheme in London, because from the degree of control desired by the English investors for their representatives on the management it appeared that they wanted to sweep the Tata firm aside. But the response of the Indian public to the appeal of the Tatas for finance was splendid. In a lecture delivered to the Staffordshire Iron and Steel Institute in 1912, Mr Axel Sahlin, a partner of Messrs Julian Kennedy, Sahlin & Co., Engineers, Pittsburg, gave a graphic description of

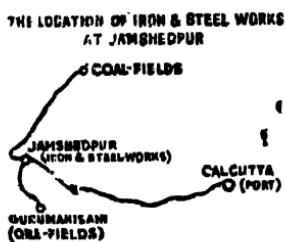
this response in the following words: 'From early morning till late at night the Tata offices in Bombay were besieged by an eager crowd of native investors. Old and young, rich and poor, men and women, they came offering their mites; and at the end of three weeks, the entire capital required for the construction requirements, £ 1,630,000 was secured, every penny contributed by some eight thousand native Indians! And, when later an issue of debentures was decided upon to provide working capital, the entire issue of £ 400,000 was subscribed for by one Indian magnate, the Maharaja Scindia of Gwalior.' The event proved beyond doubt that if a sound industrial scheme, sponsored by persons in whose ability and integrity the public has confidence, is placed before the people, probably it will not be difficult to obtain finance entirely from indigenous sources.

The story has not been related here because it is romantic or thrilling but simply because it throws a flood of light on the difficulties in the way of utilization of rich ore bodies lying in Chanda and Drug districts of the Central Province. Practically the same difficulties stand in the way of the exploitation of Jubbulpore ores. Moreover, Messrs E. P. Martin and Henry Louis the two experts who examined these ores in 1902-3, on behalf of Sir Ernest Cassel, the great English capitalist, came to the conclusion that 'the entire district undoubtedly contained considerable quantities of ferruginous metal but it was nowhere concentrated into what may be called a workable deposit.'

The location of iron and steel works at Jamshedpur conforms to the first set of conditions, discussed earlier, where the cost of transport of coal, iron ore and steel gives a 'point of minimum transportation costs' which does not coincide with any of the raw material centres or the iron and steel markets. In this case, the general markets for the finished products of Jamshedpur, lying in all directions throughout India, do not influence the location of the works. But the concentrated market for steel goods in the industrial region around Calcutta, along with the possibilities of an outlet for surplus pig iron as well as finished steel through that port exercised considerable influence on the location of iron and steel works.

The site of the iron works of the Indian Iron & Steel Company at Hirapur and Kulti and the adjacent steel works of the Steel Corporation of Bengal at Napuria, conform, however, to a second set of conditions where the iron and steel industry is

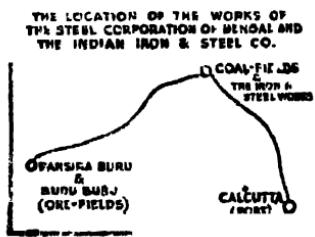
drawn to a coal district in order to eliminate the loading and unloading charges involved in two short journeys for obtaining iron ore and coal and to take advantage of the markets for iron and steel goods provided by the other industries located in the coal-fields.



The two short journeys from ore and coal mines are replaced by one comparatively less expensive, though slightly longer, journey from the ore fields. The site of the Iron and Steel

Works near Asansol coincides with the coal-fields, although the iron ore is obtained from a distance much greater in this case than that from which the Tata Iron & Steel

Works draw their supplies. But the extra expenditure incurred in obtaining the ore is counterbalanced by getting the supplies of coal near at hand.



With regard to the supply of limestone and dolomite for flux, both the works obtain their require-

ments from Gangpur area. The Indian Iron & Steel Company obtain their supplies from Bisra and Rourkela (Gangpur) while the Jamshedpur Works operate their own quarries at Panposh (Gangpur). Manganese for the preparation of spiegeleisen and ferro-manganese is obtained from the C. P. and quartz for making ferro-silicon is found in Kharakpur Hills near Monghyr. Excellent fire bricks for use in iron and steel works are made at Kumardhuli (Singhbhum). Both the works possess their own coal, ore and limestone deposits and are thus in a very fortunate position in effecting economies by integration of the mining and smelting units.

The only remaining unit of the Indian iron and steel industry lying outside the provinces of Bengal and Bihar is situated at Bhadravati in the Mysore State. For the supplies of iron ore these works depend upon the iron mines in the Bababudar Hills. The quality and composition of these ores is as follows :

| Type | Deposits | Reserves | Composition (percentage) | | |
|----------|--------------------------------------|-------------------------|--------------------------|----------------------|-------|
| | | | *Fe | P | S |
| Hematite | Bababudan Hills (Mysore State) | 250 to 600 lakh tons | 42 to 64.5 | 0.044 to 0.105 | Trace |

From the operating point of view, these works are also very favourably located. The Kemmangundi ore-fields in the Bababudan range are only 26 miles south of Bhadravati. The limestone for flux is obtained from the Bhandigunda deposits 13½ miles to the east of the iron and steel works. In place of coke charcoal obtained by wood distillation from the state forests is used for smelting the ores. The capacity of the blast furnace is limited by the amount of charcoal production which cannot be increased appreciably, but the authorities are planning to double the capacity of their blast furnace by a Duplex process, partly smelting the iron in the blast furnace and then refining it in the electric furnace by using the electric energy from the Jog Hydro-electric scheme.

The production of electric steel is also being taken up at Jamshedpur. The development of electric steel is important from a number of points of view. The electric furnace can be regulated even more minutely than the open hearth. Because of this fact, the electric steel is in a fair way to displace crucible steel for special purposes. The electric furnace is especially adapted to the making of various steels using alloys instead of carbon. Their importance is not measured by their quantity but by their usefulness for special purposes, such as the very hard nickel steel for armour plate for battleships and industrial uses where great hardness is important. Chrome steel and tungsten steel have the quality of holding their cutting power better than carbon steel in a metal working lathe. Vanadium steel is far superior to carbon steel in its lessened tendency to break without warning—a quality of special value in automobiles and other vehicles. India will require such types of special steels

⁸ The latest estimate of the iron content of these ores is between 53.85 to 64.24 per cent—Records of the Geological Survey of India, Vol. LXX, (1936), p. 147.

if she is to develop successfully ship-building, aircraft, automobile, machinery and machine tool industries.

There are grounds to believe that the manufacture of such special alloy steels is perfectly possible in India.⁹ During the War large quantities of shell bars and special alloy armour plates were being produced at Jamshedpur and considerable progress has been made in the production of special alloy steel sheets for steel helmets, steel for armour-piercing bullets, spring steel for machine-guns, deep stamping steel for rifle and machine-gun magazines.

Before the beginning of the War in 1939, the production of iron and steel in India was practically enough for her internal requirements. She was exporting about 5 lakh tons of pig iron and was importing about 3 lakh tons of steel from outside. Besides general markets for iron and steel in India, the two iron and steel companies in Bengal and Bihar have also succeeded in developing their own special markets in the form of subsidiary and allied industries in the vicinity of their own works for the manufacture of tin plates, railway wagons, cast iron sleepers and pipes, steel and wire products and the agricultural implements. New plants for the manufacture of railway wheels and tyres by an American process at Jamshedpur and for the centrifugal spinning of cast iron pressure pipes at Kulti are under construction. The results of the examination of the economies of locomotive manufacture also show that locomotives can be manufactured in India at competitive prices.¹⁰ It is very likely that the construction of locomotives will be taken up by the Tatas in Santhal Parganas under an agreement with the Government of India.¹¹

Besides the requirements of these existing industries, the demand for iron and steel is likely to increase still further in the

⁹ It has been pointed out in the Report of the Chemical Industries Committee, Bihar (1939), that the manufacture of alloys of silicon, manganese, chromium, titanium and vanadium is possible in this region (pp. 155-56).

¹⁰ J. Humphries and Kalyan C. Srinivasam: *The Construction of Locomotives in India in State Railway Workshops* (1940), p. 52.

¹¹ The E. I. Ry. Workshops at Singhbhum have now been transferred from the Indian State Railways to Tatas for the manufacture of boilers and locomotives. The first boilers are expected to come out of the Singhbhum workshop very soon and the manufacture of boilers is to be followed as soon as possible by the manufacture of locomotives.

post-war period on account of the establishment of some of the new industries such as ship-building, aircraft, automobiles, machine tools and machinery and plants of various types. But in spite of the increased demand, the production of iron and steel is not likely to be taken up in any new region and, therefore, the new demand will be met simply by increasing the productive capacity of the existing industry.

With regard to the cost of production of pig iron, the Indian industry is very favourably placed owing to the cheapness of coal and iron ore and their location at a relatively short distance from each other. Comparing these conditions with those of England, Germany, Japan or America, the Indian industry enjoys exceptional advantages and, therefore, is in a position to produce pig iron much cheaper and is able to export it from Calcutta in normal times at practically half the British price. England imports most of her ore from Sweden and Northern Spain, and Germany also draws a substantial proportion of her iron ore supplies from Sweden. Japan relies for two-thirds of her iron ore and most of the coking coal on countries outside the Japanese homeland. Even in the U. S. A. the western district of Pennsylvania gets its ore from Lake Superior region about a thousand miles away and its coal from a distance of over sixty miles.

But the economies of the steel industry are somewhat different. The industry depends upon a highly trained and technically efficient class of labour and organization. In the early stages the Indian industry had to recruit and train its labour force from the primitive people like the Santhals and had to import foreign supervisory staff. But a stage has now been reached when Indian workmen have acquired the necessary technical skill and efficiency in the handling of molten iron and the members of the covenanted foreign staff are being replaced by Indians trained locally. In spite of this progress, however, the Indian steel industry has yet to go a long way if it is to produce in future steel comparable in price and quality to that of the Western countries like the U. S. A. and Great Britain, the superiority and cheapness of whose product is mainly due to the extraordinary skill of the worker (which has descended through generations of craftsmen) and to the best kind of technical training.

The existing total capacity of the Indian iron and steel industry and its regional distribution are given in TABLE XXVII overleaf.

TABLE XXVII

The capacity and the regional distribution of the iron and steel industry

| Region | Iron and steel works | Total annual capacity | |
|--------------------------------|---|-----------------------|----------------------------|
| | | Pig iron (tons) | Steel (tons) |
| Northern India Bihar | The Tata Iron & Steel Works, Jamshedpur | 11,40,000 | 10,18,000 |
| Bengal | The Steel Corporation of Bengal and the Indian Iron & Steel Company | | 2,00,000 to 8,50,000 |
| Southern India Mysore State | The Mysore Iron & Steel Works | 28,000 | 20,000 |

In case the steel rolling mills are also taken into consideration, the distribution of the iron and steel industry on the basis of the average number of workers employed daily is given below :

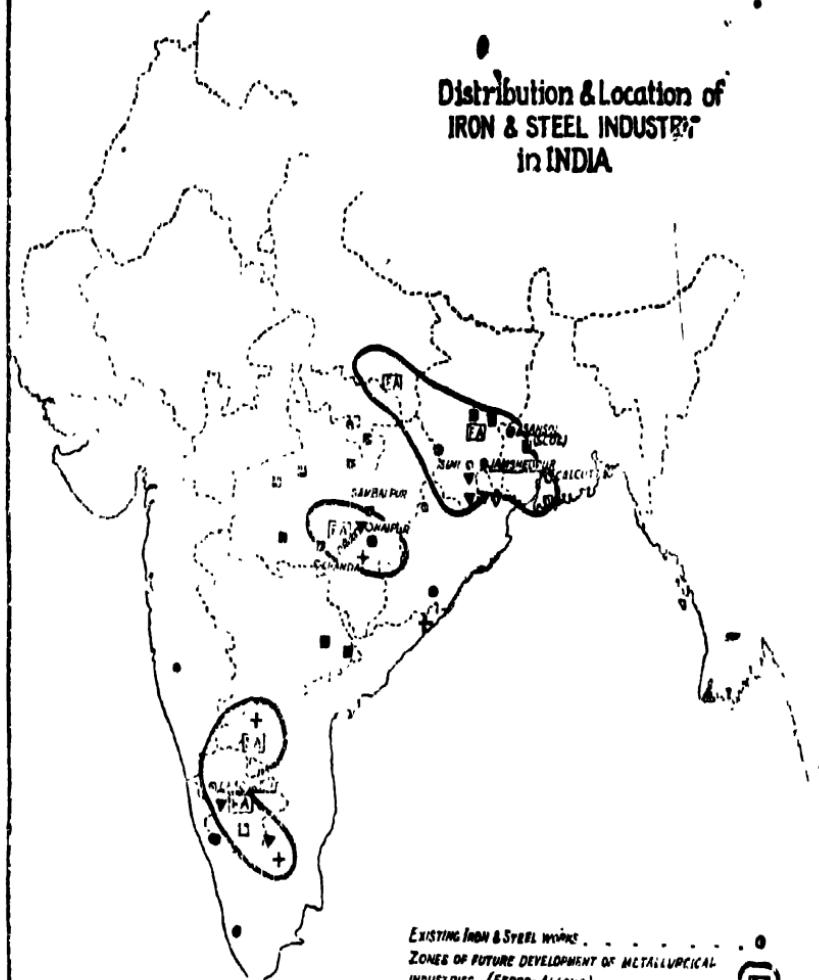
TABLE XXVIII

The regional distribution of the iron and steel industry

| Region | Province or State | No. of works | Average No. of workers employed daily (1939) | Percentage of all-India Total |
|----------------|----------------------|-----------------|---|-------------------------------------|
| Northern India | Bihar | 3 | 23,322 | 53.3 |
| | Bengal | 6 | 16,914 | 38.7 |
| | U. P. | 6 | 394 | 0.9 |
| Southern India | Mysore | 1 | 2,973 | 6.8 |
| | Madras | 2 | 128 | 0.3 |
| | | | | 92.9 |
| | | | | 7.1 |
| | | | | 100.0 |

Thus even the inclusion of the steel rolling mills in the list of the iron and steel works does not alter the picture of the regional distribution of the industry, the major part of the total productive capacity of which is confined within very narrow

Distribution & Location of IRON & STEEL INDUSTRY in INDIA



limits in the eastern provinces of Bihar and Bengal, quite adjacent to the industrial region of the province of Bengal around the port of Calcutta. Any better distribution is not possible in the near future.

The problems relating to the use of iron ores of the Central Province have already been discussed. The only remaining ore bodies of any importance are located in the Salem district of the Presidency of Madras. These ores are said to be unsuitable for use in the blast furnaces and, secondly, if these ores are to be smelted by using coke, all coal must be imported from the Bengal coal-fields. The development of hydro-electric power in Madras does not offer any better prospects for the utilization of these ores because very cheap energy is required for this purpose. The use of hydro-electricity for smelting iron has been profitable only in countries like Norway where abundant power is available for generating a very powerful and at the same time cheap current.

There are, however, some chances of such development in the Central Province, if the abundant cheap supplies of low-grade coals of this province are utilized for the generation of cheap electric power. Besides iron the manganese ores of the C. P. can also be used for the production of ferro-manganese. Such development will be very desirable from the point of view of military strategy.

CHAPTER VII

PROBLEMS ARISING OUT OF THE SCARCITY . OF LABOUR IN THE MINING REGION

We are living in the Iron Age and no nation can ever hope to be industrially great now unless her mineral resources—especially coal and iron—are properly exploited on modern lines. The total coal reserves of India are estimated at 600,000 lakh tons but the average annual output is not more than 240 lakh tons¹ and on account of shortage of labour in Indian coal mines it is not easy to increase its production. Owing to the abnormal conditions created by the war the demand for coal has increased considerably but the production has not been able to keep pace with it. Since 1942, however, the problem of the inadequacy of the supplies of coal has become one of the worst handicaps of Indian industrial production. Next to the lack of new locomotives and coaches, the shortage of coal has been the main obstacle in the way of increasing the number of passenger trains to relieve the unduly heavy congestion of traffic; it has been one of the main considerations for the withholding of permission, in a number of cases, to float new companies by the Government of India; it has affected the normal working of almost all the industries of India including jute and cotton textiles and in spite of a virtual cloth famine in the U.P. and Bengal and a general scarcity of cloth throughout the country, the cotton mills in a number of important textile centres of India have been obliged to stop working for intermittent periods for want of coal.

The Government of India have taken all possible steps to meet the situation, but it continues to cause considerable anxiety even now. The coal shortage began with the shortage of coal mining labour. The coal industry claimed that the coal labour, which was primarily part-time agricultural labour, had been diverted to other fields. At the industry's urgent request the Government of India permitted the employment of women underground in all coal mines in India; miners' employment in other works has been prohibited; besides some other allowances in the form of grain and clothing, cash wages of the miners

¹ Since 1943 it has been reduced considerably.

have been increased by 60 per cent over the pre-War level; the Government of India have imported an expert from outside to act as Coal Commissioner to assist the industry; and efforts are being made by the Central and some of the Provincial Governments to recruit labour for the coal mines. In spite of all these measures the position of coal supplies has not improved much. The supplies of coal to industry are not only inadequate to meet its requirements but sometimes a portion of the supplies is also found to be incombustible. Quite a substantial percentage of what is reaching the mills, at times, should never have been allowed to leave the coal-fields in these days of scarcity of transport.

Why is there such a chronic shortage of mining labour? The collieries are situated in areas which are sparsely populated and, therefore, almost the entire labour force has to be imported from the neighbouring areas. The great bulk of the collieries are concentrated in a comparatively small area, the outlying fields being of much less importance. The Raniganj, Jharia and Bokaro fields, which together normally produce nearly 90 per cent of the total coal output, lie in a narrow strip running roughly from Raniganj in Bengal (about 160 miles north-west of Calcutta) westwards for about a hundred miles. Adjoining them still further to the west is the less important but expanding Karanpura field, while about 50 miles to the north of the Jharia field is the Giridih field. The greater part of the Raniganj field lies in Bengal; the remainder of it and all the other fields mentioned are in the Chota Nagpur division of Bihar. In the province of Bihar about 80 per cent of the coal mining labour is obtained from within the districts of the province and the rest is drawn from the C. P., the U. P., Orissa, Bengal, C. I. and the Punjab. The main coal-fields lie in or adjacent to areas chiefly inhabited by aboriginal tribes and the main labour force was first drawn from these tribes which still continue to supply the bulk of the labour. The earliest miners were the Bauris but they have, to a great extent, been supplanted by the aboriginal Santhals, Kols, Koras and Gonds. In more recent years, large numbers of Bhuyias, Rajwars, Gopes, Lodhes and Nunias have also been employed. Most of the aborigines, especially the Santhals, like to live in the backwoods, where their harmonious flutes sound sweeter, their drums find deeper echoes and their bows and arrows are more usefully utilized. They love a

roaming life of hunting and fishing, and are used to the least possible labour except when the work has in a way become an acquired instinct.²

The scarcity of labour is a natural outcome of these surroundings of the coal mining industry. Of the heterogeneous colliery population, which is drawn from a number of provinces, a very considerable section is steeped in ignorance and superstition. They are never happier than when among their own people in their native surroundings. Economic pressure has driven them out of their homes and an opportunity of earning at home in the harvesting season brings them back flocking.³ Nearly all the aboriginal workers are also agriculturists and spend a considerable part of their working hours every year in agriculture. Some come from villages near enough to allow them to work in the fields as occasion arises; others, when they come to the mines, leave members of their families in charge of their fields returning only when their labour is most necessary; yet others, who own no land of their own find it more profitable to work in agriculture at the sowing and harvesting times than in mines on account of a substantial rise in agricultural wages in these seasons. Even those residing permanently at the coal-fields devote a part of their time to cultivating the land provided by some of the collieries. In consequence there is a marked variation in the supply of labour throughout the year. The number of workers in the mines is at its height about the end of February. Thereafter there is a diminution as the winter crops mature. The exodus is checked in April, when there is little agricultural work available, but begins with renewed strength about the middle of May, and employment is at its lowest point about the middle of July, when the sowing or transplantation of monsoon crops is at its height. Thereafter large numbers return to the mines and another peak is reached by about the end of September. From this stage there is again a decline and by the middle of November, when the rice harvest is at its height, the labour force reaches almost as low an ebb as in the middle of July. Thereafter it rises rapidly throughout the winter to the peak about the end of February.⁴

2 Bihar District Gazetteers: Santhal Parganas, pp. 121-22.

3 Report of the Bihar Labour Enquiry Committee (1940), Vol. I, pp. 185-86.

4 Report of the Royal Commission on Labour (1931), p. 117.

These seasonal migrations of the labour force affect the raisings of coal during the months of brisk agricultural activity very considerably. The quantity of coal cut in different months of the year in two collieries, given in the following table, shows the effect of seasonal absenteeism very clearly.

TABLE XXIX⁵

The quantity of coal cut in different months of the year in 1928

| Month | Tons of coal cut | |
|-----------|------------------|---------------------|
| | Loyabad Colliery | Standard Collieries |
| January | 42,508 | 34,149 |
| February | 42,001 | 37,466 |
| March | 46,907 | 36,540 |
| April | 39,729 | 36,905 |
| May | 46,934 | 42,417 |
| June | 35,817 | 34,524 |
| July | 23,458 | 28,231 |
| August | 39,100 | 42,022 |
| September | 40,123 | 43,051 |
| October | 36,425 | 43,419 |
| November | 28,694 | 35,100 |
| December | 28,268 | 37,904 |

It will be seen that the quantity raised in February or March was nearly double of that raised in July, and the quantity raised in September was the highest between the months of June and December in the case of the Loyabad Colliery, while in the Standard Collieries the lowest level of production was reached in July and the highest amount was raised in the month of October. In normal years, on an average, the amount raised in February or March is about 50 per cent above that raised in July, while the September raisings may exceed the amount for July by about 30 per cent. If the total raisings in February amount to 11 lakh tons, the total for July may not exceed 6 lakh tons.⁶ The graph facing p. 186 of the Report of the Bihar Labour Enquiry Committee, showing the raisings of coal month by month in 1937 in the Jharia coal-field also indicates the same periodicity of production. Such wide fluctuations in the amount of coal

⁵ Royal Commission on Labour (1931), Vol. IV, Part I, pp. 16-17.

⁶ Royal Commission on Labour (1931), Vol. IV, Part II, p. 316 D 2876.

raised from month to month, on account of the variations in the supply of labour, show that there is great scope for increasing the annual output of coal by making the labour force more regular.

The seasonal migrations of the labour force not only affect the total amount of coal raised, but also result in a considerable loss of time of the miners. The adjustment of labour force to the requirements of the collieries is going on practically throughout the year on account of the seasonal migrations of the workers, and the fluid labour has to move from colliery to colliery to find employment. A considerable number of working days is lost in this process. The representatives of the Indian Mining Association in their evidence before the Royal Commission on Labour stated that nearly 50 to 60 per cent of their workers followed the seasonal movement.⁷ One of the representatives deposed: 'Up to about two weeks ago I could have engaged 100 per cent more men, but they were not there. Now labour is coming in. Within a week I shall know exactly what I can employ and we shall not take any more. They will move on when they find there is no work at my colliery. They may stay for two or three days resting with their friends before they go on to the next colliery, but within a fortnight or three weeks it will have all settled down, and every mine will have just the amount of labour it requires, the extra labour having left the district. At times we get too much labour and have to send it on.'

The state of affairs disclosed by the above statement is really very deplorable in the light of the fact that such a thing takes place not merely once but actually twice or thrice during a single year. The crest of the labour-waves is reached twice—once in the month of February and again in September; similarly the trough is also touched twice—once in July and then again in November. These seasonal migrations result in a huge waste of human energy.

Not to speak of the annual or monthly irregular working of the mines, even the weekly working is equally irregular. Some of the workers come from distances of more than 16 miles. These people, after receiving the weekly payment on Sunday, go back to their homes and return to work only on Wednesday morning. In this connexion a representative of the Indian

⁷ Royal Commission on Labour, (1931), Vol. IV, Part II, p. 215 D 1934.

⁸ *Ibid.*, p. 223 D 2020.

Mining Association in his evidence before the Royal Commission on Labour said: 'There is no colliery which works on Sunday. There is practically no work on Monday; on Tuesday you will probably get about half or two-thirds; on Wednesday you start a full day.'⁹ Reasonable estimates indicate an average of 4 to 4½ days' work per week for the individual miner during the week he is at work. The combined effect of seasonal absenteeism and the short week worked by most of the miners is to reduce the average number of a miner's working days to well below half the days of the year. An industry working in this fashion can hardly be called a modern mining industry and it is not surprising if the mining industry of India working in such a disorganized and haphazard manner could not prove equal to the demands of the global war.

As the mining areas are sparsely populated, and there is a scarcity of the mining labour, it becomes necessary for the collieries to go beyond the limits of their surrounding regions to secure labour. Many of the workers have still to be recruited from areas away from the mines through recruiters or agents and the colliery proprietors still find it necessary to spend directly or indirectly substantial sums on recruiting. In this connexion the Report of the Royal Commission on Labour observes: 'The cost of recruitment varies from mine to mine, but it appears to be frequently in the neighbourhood of 3 or 4 annas per ton of coal raised. It is occasionally one anna per ton or even less and is sometimes as high as 6 annas per ton. When due regard is had to the wages paid, the amount spent on recruiting must be considered high. Each anna per ton of recruiting costs is equivalent on the average to about 10-12 annas a month for every worker employed.'¹⁰ During the last few years the cost of recruitment appears to have risen still higher. Dr R. K. Mukerjee discussing this problem in *The Indian Working Class* writes: 'The cost of recruitment is now pretty high, about annas four per ton in Jharia and annas six per ton in Raniganj, nearly 20 to 25 per cent of the raising cost. But in spite of all this costly machinery of recruitment there are spells of sudden shortage of labour when collieries have to send out emissaries of all kinds to the recruiting areas. Sometimes buses run from the coal-fields to bring miners from the neighbouring villages, and

⁹ Royal Commission on Labour (1931), Vol. IV, Part II, p. 229 D 2079.

¹⁰ *Ibid.*, p. 118.

there is good deal of poaching by one company on another's labour force."¹¹

Besides the recruiting costs, the method of securing workers itself gives rise to certain other problems. A number of collieries employ their own Jamadars or Chaprasis for recruiting labour and bear the whole cost of recruitment. The Jamadars or the Chaprasis being the paid servants of the collieries retain no control over or contact with the labour force once it has been made over to the colliery. But a number of other collieries secure labour through contractors or sirdars on the basis of commission on the tonnage of coal. In turn, the sirdars are responsible for regular and punctual working of the labourers in the mines. The contention of the management of such collieries is that the sirdars are very considerate to their miners and the miners in their turn are extremely attached to them, as the economic interest binds them together. But on the contrary the Bihar Labour Enquiry Committee says: 'We have received many complaints and a few of those complaints have been found on investigation to be true that the sirdars unscrupulously exploit the miners under their control in diverse ways.'

On account of the scarcity of labour a system of raising contractors who undertake to cut and load the coal in a tub or wagon at an agreed rate has also grown up. With regard to the total coal raised under this system the Royal Commission on Labour wrote that the greater part of the output of coal was obtained by labour working under the raising contractors. In the Jharia coal-field these contractors were responsible for about 70 per cent and in the Raniganj field for about 40 per cent of the output. According to the Report of the Bihar Labour Enquiry Committee, 75 per cent of the total production of coal for which the members of the Indian Mining Association are responsible is raised by sarkari and only 25 per cent under contract; the Serampur colliery of the East Indian Railway is operated on the sarkari basis; and of the four collieries of the Tata Iron & Steel Company, those at Jamadoba and Digwadih, are, for the most part, under the sarkari system while those at Malkera and Choi-todih are for the most part under contract.

It is a fact, however, that the workers employed under the sarkari system receive more consideration than those employed

¹¹ R. K. Mukerjee: *The Indian Working Class* (1945), p. 25.

¹² Report of the Bihar Labour Enquiry Committee, Vol. I, p. 187.

by the raising contractors. Besides this, the employment of workers in the coal-mines through the contractors is open to special objections as it involves dual control and divided responsibility. With regard to this the Royal Commission on Labour observed: 'Both in law and in fact the manager is responsible for the safety of the workmen; he determines where coal should be worked and his decisions have the closest effect on the security of the miner. But even the safety men are not the manager's subordinates, being selected and paid by the contractor. The law also holds the manager responsible for compliance with its provisions in respect of hours of work, holidays, the employment of women, etc. As a rule he has also responsibility for housing and other matters (e. g. water supply) affecting the welfare of the worker outside the mine. Yet he has ordinarily no responsibility for the selection of the workers, the distribution of their work, the payment of their wages or even the numbers employed.'¹³ The Commission recommended the gradual supersession of the raising contractor as such, and the substitution of what is known as sarkari working. The Bihar Labour Enquiry Committee also arrived at the same conclusion in respect to this question. Their report says: 'We would prefer to see the system of raising contractors abolished as soon as possible. But in case it is found impracticable to abolish it, the conditions governing contract labour enumerated in chapter V should be enforced. These will secure to the workers under the raising contractors the wages on the same level as those for sarkari workers of the same category. Indeed we are inclined to believe that these will make sarkari the preferable alternative even for the collieries and therefore lead to its general adoption.'¹⁴

Most probably it is on account of the variations in the strength of the labour force on different days of the week and during the different months of the year, and of the different systems of engaging the labour that the mechanical equipment in the collieries is generally inferior or inadequate and the efficiency of the workers is poor in comparison with other countries.¹⁵ So far as the application of up to date mining machinery is concerned, it cannot be an economic proposition to the colliery

¹³ Report of the Royal Commission on Labour (1931), p. 119.

¹⁴ Report of the Bihar Labour Enquiry Committee (1940), Vol. I, p. 190.

¹⁵ *Output of coal in tons per head of labour* (Royal Com. Vol. IV, Part I, p. 220): (See table on opposite page)

proprietors, if part of it is to lie idle for two days in a week and for a number of months in the year on account of the fluctuations in the monthly numbers of workers. Practically the same thing is true in the case of tubs supplied to the workers for loading coal. The workers complain about the shortage of tubs during the busy season but the proprietors cannot provide tubs on the basis of their requirements in the month of February if a large proportion of them will not be required in other months.

The methods of working are so inefficient that there is practically a loss of 50 per cent coal in mining. It is only the non-aboriginal workers from Bihar, the north-east of the C. P. and the east of the U. P. who use 'compressed pellets' (a commonly used form of gun-powder) for blasting coal. These workers form only an increasing minority of the total labour force. The majority of the miners, who are aborigines generally cut the coal with picks. The use of modern coal mining machinery is also on the increase.

Regarding the aptitude of the Indian worker as compared to the Western miner for using machinery, Mr R. Heron, of the Jharia coal-field, in his evidence before the Royal Commission said: 'At home the miner undercuts the coal first, then shears in the side, and then having regard to the line of least resistance he will bore his fire holes and blast it down. The Indian miner simply stands on his feet, swings the pick round and knocks a bit off here and there.' His impression was that the Indian miner was not responsive to a demonstration of better methods. But the experience of another foreign gentleman, Mr J. Kirk, Superintendent, Jamadoba Colliery of Messrs Tata Iron & Steel Co. Ltd., was quite different on this point. According to the replies given by Mr Kirk to the questions put by the Royal Commission on Labour the aptitude of the Indian miner is shown clearly by the latter's readiness to learn new ways and by his handling of the

| Country | Above and below ground | Below ground only | Year |
|---------|------------------------|-------------------|------|
| U. S. | 780 | 930 | 1926 |
| U. K. | 252 | 316 | 1927 |
| Germany | 278 | — | 1926 |
| France | 160 | 225 | 1927 |
| Belgium | 154 | 219 | 1927 |
| Japan | 132 | — | 1926 |
| India | 122 | 176 | 1927 |

cutting machines as well as any British miner. It is all therefore a matter of supervision and teaching.¹⁶

Thus the inefficiency of the Indian miner is not so much due to inaptitude as to other circumstances. At present he is a part-time agriculturist. If he devotes himself entirely to mining he can certainly show much better results.

The foregoing discussion shows that most of the problems and difficulties of the mining industry of India are connected with the scarcity of labour in the mining region. There is no doubt that the region is sparsely populated but that does not prevent the industry from attracting workers from other parts of the country as has actually happened in the case of most of the other industries of India. There has been a tendency for at least a part of the labour force to settle down permanently on the coal-fields. The following estimates of settled, recruited and local labour were placed before the Royal Commission on Labour :

TABLE XXX

| Coal-field | Estimates of Mr Amrit Lal Ojha member of the Mining Board, Bengal | | | Estimates of the Secretary Indian Mining Federation | | |
|------------|---|-----------|-------|---|-----------|-------|
| | Percentage of— | | | Percentage of— | | |
| | Settled | Recruited | Local | Settled | Recruited | Local |
| Jharia | 20 | 75 | 5 | 15 | 75 | 10 |
| Raniganj | 25 | 50 | 25 | 30 | 50 | 20 |

There is not much difference between the two estimates. The figures show that between 15 and 30 per cent of the labour was settled permanently in the colliery areas. A later enquiry into 1030 miners' families in Bihar showed that 440 (42 per cent) have not left the coal-fields for visiting their villages at all, 57 families were found visiting their homes only once in three years or yet longer intervals. Thus 497 families or 48 per cent of the total labour force may be regarded as permanently settled in the coal-fields of Bihar.¹⁷ A comparison of this percentage of settled labour with those given in TABLE XXX shows that the growth of permanently settled labour force during the last fifteen years has been quite satisfactory. The assignment

16 Royal Commission on Labour (1931), Vol. IV, Part II, p. 278 D 2551 and 2552.

17 Mukerjee, op. cit., p. 7.

of small holdings to the miners for cultivation as a condition of service in the mines was also used as a method of settling labour permanently by some of the colliery companies which held zemindari or surface rights in the land. The system, though of advantage both to the management and the miners, is liable to abuse as the miners may be forced to accept conditions for fear of losing their holdings, which, had they been free, they would not have done. To remove this drawback the Royal Commission on Labour recommended that the local government should take steps to put the service holdings on an equitable cash basis.

A very important factor responsible for the scarcity of labour in the mining region may also be the inadequacy of wages to attract the necessary labour. From the long-range point of view, the question of coal mining wages was examined by Mr Hughes, who reported on the cost of living and the level of wages in the Jharia coal-fields. The problem was also considered by the Bihar Labour Enquiry Committee in 1940. Lastly the question was further examined by Prof. D.T. Jack, lately Labour Adviser to the Government of India.

Mr Hughes' conclusion was that, in general, the competition for the services of the miners was too great to warrant the view that miners were underpaid. On the contrary the Bihar Labour Enquiry Committee remarked that 'it was apparent that the earnings of the miners were too low, when regard was paid to the risks and difficulties of occupation.'¹⁸ Prof. Jack, however, remarked: 'Hitherto whatever view may have been taken of the adequacy of miners' earnings, these earnings have presumably been sufficient to attract the necessary supply of labour. But it is not clear that the competing power of coal miners is strong enough to enable them to deal on terms of equality with their employers, and in the absence of adequate collective bargaining there would seem to be some general justification for the creation of special wage fixing machinery.' The Bihar Labour Enquiry Committee have expressed themselves quite definitely on this point, but even Prof. Jack admits, though in a round about way, the inadequacy of the miners' earnings when he recognizes the weakness of the miners' bargaining power.

With regard to the problem of inadequacy of the miners' earnings Dr Mukerjee is of the opinion that 'during the last two

decades there has been a marked decline in the earnings in the coal-fields.¹⁹ In 1936, the earnings of the miners were reduced by about one-half and of loaders by about one-third as compared with the earnings in 1927. Besides low tub-rates, deficiency and irregularity in the supply of tubs, absenteeism and over-plus of workers due to seasonal variations, the chaotic character of the coal industry has been mainly responsible for the low earnings of miners. The supply of the railway wagons is very irregular. At times the supply of a large number of wagons results in sudden outburst of feverish work in the mines, while at other times the shortage of wagons ushers in long periods of forced idleness. The collieries try to meet the situation by keeping a large reserve force which is under-employed in normal times. As a consequence of this irregularity the quota of work and the earnings of all the workers are reduced. The ratio of wages of the miners to prices of coal is definitely much lower in India in comparison with other countries. The miners' wages amounted to 50, 38 and 12 per cent of the price of coal per ton at the pit head in Great Britain, Japan and India respectively in the immediate pre-war years.²⁰

Besides the question of wages, working conditions may also be partly responsible for the scarcity of labour. In this connexion the Royal Commission on Labour remarked: 'In present conditions a shortage of labour and the necessity of sending out emissaries to recruit indicate that all is not well with an industry, and we would emphasize the importance of making conditions sufficiently attractive to secure labour without recourse to systematic recruitment.' Improvements in underground working, better wages, better housing, medical assistance, and sanitation, and more reasonable hours of work will all contribute to make the work more attractive to labour and will facilitate the growth of a more regular mining population. During recent years the conditions have been considerably improved but they are as yet not very satisfactory. The Bihar Labour Enquiry Committee (p. 190) has made a number of recommendations for improving medical facilities, housing accommodation and water supply. If the suggested improvements are carried out they will go a long way towards making the working conditions far more attractive for a settled mining population than

¹⁹ Mukerjee, *op. cit.*, p. 106.

²⁰ Mukerjee, *op. cit.*, p. 123.

they are at present. The money spent by the industry in recruiting would be invested much more effectively in improving the conditions of labour at the mines.

The following statements of Mr R. R. Simpson, the Chief Inspector of Mines in India before the Royal Commission on Labour clearly indicate that healthy working conditions are an essential preliminary of the growth of a settled mining population independent of agriculture. To the question whether it would be to the interest of the miners to be dependent wholly on coal cutting Mr Simpson replied: 'It is very doubtful; it will probably adversely affect his physique until better conditions were given. I suggest that the conditions should be improved until they are such that all the year round work in the mines will not be harmful to him. I think it would be a good thing to have a settled labour when the conditions are such that a man can work at the mines all the year round without his physique being impaired.' In reply to a further question whether he thought it was possible, he stated: 'In most countries the miners work in the mines all the year round and have no other occupation. It is also the case in certain parts of India, for instance, the Khewra salt mines. I think the present system by which the Indian coal miner goes away preserves his physique. He goes away for a period of rest and recuperation and that keeps him fit and well. I think there are already a large number of miners who do very little agricultural work. When they go back to their villages it is more often for a period of rest, and the miner has to earn sufficient at the mines to support him during the rest period.'

The improvement of underground conditions is not very difficult. The Indian miner is, in this respect, more fortunate than the miners in Europe. Most of the coal in India comes from thick seams of 10 feet and over, seams of less than 5 feet being rarely worked. In consequence, the main underground roads are generally spacious and the working places almost invariably allow the miner to stand upright at his work. As yet the mines have not reached any great depth, those over 500 feet in depth being exceptional and the lead to the working place is seldom unduly long. Inflammable gas is not common and most of the mines can be worked with naked lights. Lighting and ventilation, under these conditions, are not difficult. Thus the real problem of improvement in working conditions exists in the settlements and villages of the miners in the colliery areas.

If India is to occupy a proper place among the leading industrial nations of the world, she must reorganize her mining industry on a modern basis to achieve efficiency in production and to ensure more regular and expanding output of coal; and if the mining industry is to attain this objective, it must have a permanent labour force. Referring to this problem in his speech at the Annual Meeting of the Associated Chambers of Commerce at Calcutta, on December 14, 1944, His Excellency the Viceroy said: 'It is doubtful if the mining industry will ever be stable or contented until a real effort has been made to establish a permanent labour force in good condition. If we are to produce all the coal we need for industrial development after the war, it must be worth a man's while to become a whole-time miner; even after the ban on women working underground has been reimposed.' The passage is note-worthy; if the industry is to produce the necessary amount of coal required for the future needs of industrialization of the country, it must have a permanent labour force; and if a permanent labour force is to be built up, the provision of good working conditions is essential.

But the 'ban on women working underground' although very desirable on humanitarian grounds, is a great hindrance in the way of establishing a permanent labour force. The exclusion of women from underground working has reduced the miners' and loaders' family earnings, and has proved economically disadvantageous and socially disruptive. For permanent settlement of labour force in healthy social surroundings it is essential that all possible steps should be taken to reserve for miners' women vacancies occurring among the surface workers wherever practicable. Avenues for the employment of women should also be explored in the new auxiliary industries for utilizing coal-tar and other by-products of coal. The post-war development plan of the Bihar Government, envisages the establishment of large-scale mechanical and chemical industries to be developed from iron, coal, mica, bauxite, refractory materials, etc. Two of the major industries, viz. the nitrogen industry and low temperature carbonization, which have already been taken up by the Bihar Government, are being located in the coal-field areas. It has been decided that the factory for manufacturing 3,50,000 tons of ammonia should be set up at Sindari, near Dhanbad. These new industries should provide some scope for the employment of miners' women, which will greatly assist the development of a permanent mining population.

CHAPTER VIII

THE DISTRIBUTION OF SUGAR INDUSTRY IN NORTHERN INDIA

Sugar industry, like cotton and jute textiles, depends upon agriculture for its raw materials. But unlike the cotton and jute fibres, the sugar-cane is a 'weight-losing' material as the sugar produced from it ranges from 9 to 12 per cent of the total weight of the cane used. The cane is more difficult to transport than sugar and its sucrose content begins to deteriorate after it has been cut from the field and better recovery is dependent upon its being crushed within twenty-four hours of its separation from the roots. In this respect sugar-cane is comparable to milk, vegetables and fresh fruits. Just as butter is prepared near the source of milk, and as canning industries grow up in the districts with a surplus production of vegetables and fruits, so sugar factories have to be installed in the areas where sugar-cane is grown in sufficient quantities; the factories must obtain enough supplies of fresh cane for crushing in their immediate neighbourhood.

In the case of most of the factory industries, the source of power is an important consideration and, therefore, in establishing such factories the question of the supply of fuel or electricity always plays an important part in the choice of their location. But the sugar industry is entirely independent of the supplies of coal or electricity for running the machinery, because the bagasse obtained as a by-product is more than enough to meet the entire requirements of the mills for raising the steam to drive the machinery and no supply of fuel from outside is needed. Besides these considerations, the price of sugar-cane constitutes 52.58 per cent¹ of the total cost of white sugar. These factors make the sugar manufacture a 'raw-material-localized' industry and as the local distribution of sugar-cane is more or less entirely dependent on climate and rainfall, nature plays a decisive part in the location of this industry.

Sugar-cane thrives best in the tropical climate, but can be grown successfully in sub-tropical regions also. Most of the important sugar producing countries of the world—Java, Cuba,

¹ Report of the Indian Tariff Board on Sugar (1938), p. 70.

Hawaii, Mauritius and Philippines—are situated within the tropical belt. The cultivation of sugar-cane in sub-tropics, outside India is unimportant. Among our neighbours South Africa and Australia produce sugar-cane in the sub-tropical regions.

The sugar-cane producing areas in India may be divided into two fairly distinct regions—sub-tropical, comprising northern and central India and the tropical, comprising peninsular India. *Prima facie* it appears reasonable to expect that peninsular India, where the climatic conditions approximate to those in Java and the West Indies, should be the principal sugar producing region. But actually the reverse is the case: more than 90 per cent of the total acreage under sugar-cane lies in the sub-tropical belt of northern India and the tropical peninsula accounts for less than 10 per cent only.

The success of sugar-cane production in northern India since ancient times is mainly due to the advantages conferred by the rich and fertile alluvial soil of the Gangetic plain and the presence of thin varieties of cane admirably suited to the climatic conditions of this region. These thin canes are said to be indigenous to northern India. It is claimed that they were evolved from wild grasses in the south-eastern corner of the mainland of Asia, probably round the head of the Bay of Bengal.² From this place these canes spread westwards in India and even beyond to other neighbouring continents.

From the point of view of acreage under sugar-cane the United Provinces and the province of Bihar have always been the most important. On an average (1935-36 to 1939-40) these two provinces accounted for 55.2 and 10.5 per cent respectively of the total sugar-cane area in the whole of India. Taken together the two provinces were responsible for nearly two-thirds (65.7 per cent) of the total sugar-cane acreage in the record crop year 1936-37.

For sugar-cane cultivation the United Provinces may be divided into three regions—Eastern, Central and Western. The monsoon sets in usually in June and the air is more or less saturated with moisture till the close of September. But the amount of rainfall varies according to the position of the three most important cane growing tracts. Generally the rainfall decreases from the east to west and from the northern sub-montane belt to the south. In the eastern region (Gorakhpur division) the rainfall ranges

² *Indian Sugar*, Nov., 1939, p. 54.

from 40 to 48 inches, in the central region (Fyzabad and Lucknow divisions) from 38 to 41 inches, and in the western region (Meerut and Rohilkhand divisions) from 26 to 50 inches. In the eastern region as a whole the summers are hot and the winters are mild and the sugar-cane is generally grown without irrigation. In the central region the extremes of temperature are not very great and the danger of damage by frost is also very little. But in the western region the climate is rather extreme. The summers are hot and dry and the scorching, dry and strong west wind continues to blow till the monsoon sets in. The winters are cold and the crops of sugar-cane are likely to be damaged by frost. A factory in the Meerut division reported to the Tariff Board on Sugar (1938) that frosts were likely to occur once in every five years and the loss to sugar-cane crop was estimated at 20 per cent. In a particularly bad year like 1934-35 they had to burn half the cane in their farm. Another factory reported a loss of 80 per cent of the crop.³ Sometimes the lower temperatures which are liable to occur in Rohilkhand between December and February also prove injurious to cane.⁴

The variations in rainfall both in the central and western regions make irrigation essential. But the level nature of the plain and the presence of snow-fed rivers flowing through it make the construction of canals very easy and less expensive. Most of the districts in both these regions are, therefore, very well served by an excellent system of canals, which has been further supplemented in the western region by an extensive system of tube-wells operated by hydel energy. The sub-soil water for these wells is available only a few feet below the surface and the irrigation charges are very moderate. The main reason for the unique position of the United Provinces with regard to sugar-cane acreage is the provision of ample and cheap irrigation facilities. In the early period of growth of sugar-cane, throughout the hot and dry season, the crop is almost entirely dependent on artificial irrigation.

The soil of the main cane growing regions is the alluvium of the Gangetic plain, the great bulk of which contains adequate quantities of lime and potash, though the amount of nitrogen present at any time is small. The loamy soils found in these areas are also excellent for cane and substantially reduce the

³ Report of the Indian Tariff Board on Sugar (1938), p. 68.

⁴ Report of the Indian Sugar Committee (1920), p. 35.

expenditure on artificial manures. The agricultural operations are simple and the preparation of the soil does not cost much. Such factors like the cheap irrigation facilities and the excellent quality of rich soil are mainly responsible for the production of sugar-cane in normal times at such a low cost as 3 as. 7 pies per maund. In the United Provinces there are no cash crops as paying as sugar-cane and, therefore, the choice of the cultivator in the matter of cash crops is very limited. For this reason, sugar-cane is found growing in the U. P. in concentrated and compact blocks. This fact enables the factories to obtain their supplies within reasonable limits.

In the province of Bihar the most important cane growing region lies in north Bihar between the mountains on the north and the river Ganges in the south. The conditions in this area approximate to those of the eastern cane region of the United Provinces. The monsoon sets in somewhat earlier and lasts longer than in the U. P. but the rainfall in this area is more intermittent than it is further east. The average annual rainfall in the sub-montane tract is from 50 to 55 inches but nearer the Ganges it may not exceed 40 or 42 inches. On the whole the summers in North Bihar are hot but the winters are mild and the sugar-cane crops are not liable to damage by frost.

This region is a level plain falling gradually from the foot of the Himalayas but with a belt of fairly high land near the banks of the river Ganges. The soil consists mostly of older alluvium but it has been replaced by more recent deposits of sand and silt in the low lands, through which the Himalayan rivers have found their way to the Ganges at one time or another. These later soils have the remarkable property of being retentive of moisture. This quality is especially valuable in view of the fact that the rainfall is capricious and that practically all the cane in this region is unirrigated. The agricultural practices in this region are nearly similar to those of eastern U. P. and the preparation before planting is not very costly. On account of the favourable characteristics of climate and soil, the sugar-cane normally produced here costs 3 as. 4 pies per maund. The ryot in this region is more dependent on sugar-cane as a cash crop than he is in the U. P. Besides this, Bihar also possesses sugar-cane plantations managed by the firms of planters, who took to sugar-cane planting after the collapse of indigo and opium plantations. On account of these factors the sugar-cane areas

in this region are sufficiently compact to enable the factories to obtain their supplies of cane within reasonable limits.

The conditions in South Bihar are not so favourable for sugar-cane. The rainfall is about 42 inches and the presence of alluvium in this area is less marked. The heavy clay requires irrigation, facilities for which are lacking. Attempts are now being made to develop tube-well irrigation on the lines of the U. P.

The province of the Punjab ranks next to the U. P. in sugar-cane acreage. Between 1908-09 and 1928-29 the sugar-cane area in this province remained on an average at about 15 per cent of the total cane acreage in the whole of India. Practically the same position is being maintained even at the present time. But on account of climatic factors the province is not in a position to show equally satisfactory results in the production of white sugar.

Most of the cane in the Punjab is grown to the east and the south of the river Chenab. In the whole of this region the extremes of temperature are very marked, the temperature varying from below freezing point in December and January to a maximum of about 116 degrees in May and June. Frosts are severe enough to affect the sucrose content of the cane appreciably or even sometimes to destroy the crop. According to the Report of the Tariff Board (1938), 'in a severe frost 90 per cent of the cane area is affected and the losses are estimated at 50 per cent.' During the summers the hot and dry winds retard the early growth of cane. The soil of the province is an alluvial loam, generally sandy and fairly uniform. But the rainfall in comparison with the U. P. and Bihar is much less and irrigation is a necessity. The percentage of irrigated cane in Hoshiarpur and Ambala is between 75 and 80 while the district of Lyallpur grows nothing but irrigated cane. The irrigation charges, however, are very low because the presence of snow-fed rivers and the level nature of the plain have enabled the province to establish an irrigation system probably unparalleled in the world.

The limiting factor in the case of this province is the rigorous climate. For a capital outlay similar to that of the U. P. and Bihar, average output of sugar-cane per acre is much less and the cost of production of sugar-cane is estimated to be 5 as. per maund as against 3 as. 7 pies in the U. P. and 3 as. 4 pies in Bihar. Besides this, the cane is inferior in quality. It contains

⁵ Report of the Indian Tariff Board on Sugar (1938), p. 68.

more fibre and less sucrose in comparison to the cane of the U. P. and Bihar.

The province of Bengal ranks next after the Punjab in sugar-cane acreage, but it enjoys a better climate for growing sugar-cane than any of the North Indian provinces discussed so far. Sugar-cane requires a long humid season during the period of growth with an average mean temperature of 78°F. and a fairly dry cold season with an average mean temperature of 59°F. Good rainfall is essential because in the absence of hot steamy air, which provides an incentive to its growth, the sugar-cane may not yield satisfactory results in spite of being fully irrigated. Bengal like other provinces of Northern India lies in the sub-tropical zone but on account of its nearness to the sea, it enjoys certain tropical advantages. The climatic superiority of Bengal over the other provinces of the north is shown in the following table :

TABLE XXXI

| | Average January | Average July | Mean Annual Rainfall (inches) |
|---|--------------------|-----------------|-------------------------------------|
| Temperatures favourable for sugar-cane cultivation | 59 F. | 78 F | |
| Conditions in the capital towns of the provinces | | | |
| Calcutta (Bengal) | 61 | 84 | 64 |
| Patna (Bihar) | 61 | 63 | 46 |
| Allahabad (U. P.) | 61 | 86 | 39 |
| Delhi (Delhi) | 59 | 88 | 28 |
| Lahore (Punjab) | 55 | 91 | 20 |
| Peshawar (N.-W. F. P.) | 51 | 91 | 13 |

The climatic conditions in Bengal as a whole approach very near to the ideal conditions but the local differences in different parts are well marked. The rainfall to the west of a line joining Khulna and Darjeeling may not be more than 55 inches. The early summer rain in this part in March and April is comparatively rare and the first showers of the year fall often as late as in May. The monsoon ends abruptly and the rainy season is confined to five months from May to September. To the east of this line, however, the total precipitation is well over 100 inches,

the early showers in March and April are common and the monsoon lasts till October, giving a rainy season of some eight months' duration.

From the point of view of soils also, the province of Bengal is better equipped than the western provinces. The soils of the U. P. and Bihar are mostly formed on old alluvium but in southern, eastern and northern Bengal the soils formed on the new alluvium of the Ganges, the Brahmaputra and the Meghna occupy extensive areas.

For the cultivation of sugar-cane the greatest drawback of western Bengal is the lack of early summer rain in the planting season. The soil of the Burdwan division is not very retentive of moisture and artificial irrigation on a large scale is not feasible because suitable alignment for perennial canals is absent. The absence of coarse grained sand in the water-bearing stratum of these tracts bars the construction of tube-wells. In north-eastern Bengal water-logging conditions create special problems and tea is a formidable rival of sugar-cane in Jalpaiguri. In eastern Bengal vast tracts are more or less submerged under water during the monsoon, creating conditions more suitable to jute and rice than cane and, therefore, this region is up to the present time a scene of the most signal victory of jute over cane. Taking all these conditions into account, the region most suitable for sugar-cane cultivation comprises the districts of Dinajpur, Rangpur, Malda, Bogra, Rajshahi, Pabna, Murshidabad, Nadia, Dacca and Mymensingh. The cost of production of sugar-cane in Bengal is estimated to be 4 as. per maund.

The four provinces discussed above account for the major portion of the sugar-cane acreage in northern India, but on account of certain peculiarities of climate the cultivation of sugar-cane is also carried on in the Peshawar Valley in the extreme north-west corner and the Assam Valley in the north-east corner of India. The temperatures in the Peshawar Valley vary from 30° F. in December to 120° F. in May and June and four degrees of frost may sometimes be recorded in winter. The rainfall is also precarious. But as the valley receives approximately equal amount of rain in winter and summer a high degree of humidity prevails even in the summers. The light, porous soil and the peculiarity of climate have enabled the valley to grow not only the ordinary thin canes of northern India but also certain varieties of thick canes.

The climate of the Assam Valley also possesses certain peculiarities of its own. Unlike other parts of northern India, the year, in this valley, may be divided into two seasons, the cold season and the rainy one, the dry hot weather of the rest of India being entirely absent. In the early summer from March to May, when rainfall over Upper India is at its minimum, this valley receives copious rains. The total rainfall is also over 100 inches. The climate on the whole is characterized by coolness and humidity. The alluvial soil consists of a mixture of sand and clay. The properties of the soil and the characteristics of the climate enable the valley to grow with complete success without irrigation thick varieties of canes.

The potentialities of the valley are quite substantial as there are vast areas of unoccupied land available for the development of sugar-cane plantations on the lines of tea gardens. At the present time the difficulties of communication and the low incidence of population militate against proper development. But perhaps the post-war period may find the communications in Assam revolutionized and the future has to show as to how these new changes will affect the growth of the sugar industry in this valley.

The differences in the conditions of soil and climate in the provinces of northern India have been discussed above. The natural conditions appear to be more favourable for cane in Bengal and as one moves westwards from the lower courses of the Ganges towards the Punjab they go on becoming less hospitable. The figures in TABLE XXXII opposite show the influence of these conditions on the quality of cane and the output of cane and sugar per acre.

The sugar-cane is at its best in warm and moist climates. Cold in any degree hampers its growth and development and hot and dry winds are also harmful. Accordingly we find that of all the provinces, the figures for which have been given in TABLE XXXII, the recovery percentage is the lowest for the Punjab and therefore the quantity of sugar-cane required to produce a maund of sugar is more. And finally on account of lower sugar-cane output per acre the estimates of sugar per acre for this province are the lowest. The recovery of sugar per cent of cane for Bengal is also lower and consequently the quantity of cane required to produce a maund of sugar is more in comparison to the U.P. and Bihar. But on account of higher sugar-cane output per acre the

TABLE XXXII

| Province | Recovery of sugar per cent of cane | | Maunds of sugar-cane required for producing a maund of sugar | | Average yield per acre (Cane) | | Estimated tons of sugar per acre | |
|----------|------------------------------------|---------|--|---------|---|-----------------------------------|----------------------------------|---------|
| | 1935-36 | 1936-37 | 1935-36 | 1936-37 | Estimates of the Tariff Board (1938) Tcns | Average (1935-36 to 1939-40) Mds. | 1935-36 | 1936-37 |
| Bengal | 8.19 | 8.64 | 12.21 | 11.57 | 17 | 451 | 1.47 | 1.47 |
| Bihar | 8.93 | 9.20 | 11.20 | 11.87 | 13.14 | 304 | 1.34 | 1.38 |
| U. P. | 9.60 | 9.65 | 10.42 | 10.36 | 13.18 | 361 | 1.44 | 1.45 |
| Punjab | 7.87 | 8.88 | 12.71 | 11.26 | 12.16 | 206 | 0.63 | 0.71 |

estimates of sugar per acre are the highest. In the U. P. and Bihar the recovery is much better and therefore in spite of the lower cane output per acre the estimates of sugar per acre are very satisfactory. The inferior sucrose content of the Bengal cane and its causes are the subject of some controversy but probably the most important factor responsible for this has been the non-availability of good early canes of the order of Co. 76 or Co. 313 in Bengal, which are now under extensive cultivation in the United Provinces and Bihar respectively. On the whole the industry in the province of the Punjab is definitely at a disadvantage from the point of view of quality and output of cane and the industry in the United Provinces and Bihar is better placed than in Bengal.

But the position of sugar-cane in the agricultural economy of a province is not governed by climatic factors alone. The range of alternative cash crops available in different provinces, which compete with sugar-cane for a place in the scheme of crops, is a very important consideration. In the U. P., Bihar and the Punjab the cultivation of sugar-cane is looked upon as principal occupation of life, which gives the cultivator and his family occupation during the slack period of the agricultural year and which he is reluctant to abandon, however slender the margin of profit, because he can find no suitable alternative.⁶ In Bengal on the other hand the cultivator has not only a choice between

⁶ Report of the Indian Tariff Board on Sugar (1938), p. 41.

several crops in quite a number of districts but it is difficult to some extent to induce him to take up sugar-cane in preference to other crops like jute to which he is accustomed. For this reason the cultivation of sugar-cane has been more important in Bihar, the U. P. and the Punjab than in Bengal and continues to be so even up to the present time. This fact is illustrated very clearly by the percentages of cane areas to the total area under cultivation in different provinces given below:

TABLE XXXIII

| Province | 1928-29 (Percentage) | Average (1935-36 to 1939-40) |
|----------|-------------------------|---------------------------------|
| Bengal | ... | 0.68 |
| Bihar | ... | 0.95 |
| U. P. | ... | 3.12 |
| Punjab | ... | 1.25 |

These percentages show that the comparative concentration of sugar-cane areas has been the highest in the United Provinces and lowest in Bengal. In spite of considerable increase

recent years in these percentages in all the provinces the comparative position has not been altered up to the present time. For the development of modern sugar factories the concentration of the sugar-cane crop is a very important factor as it acts as an index, to a certain extent, of the possibility of getting fresh cane for crushing within reasonable distances. Account of better concentration of cane areas in the U. P. and Bihar, the mills in these two provinces generally receive a far higher proportion of their cane requirements at the gates than is possible in Bengal. The respective percentages of the cane supplies at the gate in different provinces are given below:

TABLE XXXIV

| Province | Approximate percentages of gate cane to the total quantity of cane crushed |
|----------|---|
| Bengal | 40 |
| Bihar | 53 |
| U. P. | 65 |
| Punjab | 57 |

It will be seen that these percentages appear to be sufficiently correlated to the percentages of the sugar-cane areas given in TABLE XXXIII. The mills in Bengal are at a great disadvantage not only on account of the deterioration of the sucrose of the rail-borne cane (sometimes drawn from a distance of 160 miles) and the expenses involved in the maintenance of a purchasing staff, but also because of the heavy freight bill which the mills have to meet on this account.

On the manufacturing side of the sugar industry the length of the crushing season is a very important factor. The incidence of the manufacturing charges varies in inverse proportion to the length of the crushing season. The average number of working days for the four northern provinces is given below:

TABLE XXXV

| Province | Number of working days (Average 1935-36 to 1938-39) |
|----------|---|
| Bengal | 108 |
| Bihar | 113 |
| U. P. | 119 |
| Punjab | 105 |

The crushing season is the shortest in the Punjab and in Bengal it is shorter than in the U. P. and Bihar. The short duration of the season in the Punjab can be explained with reference to the extreme climate of that province but in the case of Bengal the shortness of the season appears to be incompatible with the natural conditions of that province. A number of factors are responsible for this. First of all the production of cane in this province has remained confined mainly to mid-season varieties, particularly Co. 213, and there has been a comparative scarcity of early and late ripening varieties which have not been taken up by the cultivator because they would interfere with the scheme of his other crops. Secondly, the cultivation of sugar-cane in this province is much diffused. Unlike the U. P. and Bihar many extensive patches of land with the same ground level suitable for the cultivation of cane are not available in this province. In the main sugar-cane region (consisting of the districts of northern and central Bengal) the level of land is found to be very irregular, inasmuch as small patches of high and dry

land are found juxtaposed with fairly low lands or swamps. Naturally different crops are grown even in adjacent plots according to their respective soil conditions. Thus the sugar-cane fields are interspersed with paddy fields, and the paddy is not harvested till the middle of December. Then again owing to early arrival of monsoon the preparation of fields for planting the next crop reaches an advanced stage by the end of March. On account of this fact any large-scale movement of bullock-carts carrying cane earlier than mid-December and later than the last week of March becomes difficult. These factors confine the crushing season of Bengal between December and March.

Now taking into account the quality of cane and its yield, the concentration of sugar-cane areas and the duration of the crushing season, the circumstances as a whole are more favourable for the development of sugar industry in the U. P. and Bihar than either in the Punjab or Bengal. Moreover, north Bihar and eastern U. P. had the advantage of early start. The earliest attempts to start the sugar mills in north Bihar were made by the Dutch planters in 1841-2 and by the English planters in 1899. In spite of the failure of these early attempts the sugar industry came to be established on a sound footing in this region as early as 1903.

When the position of the sugar industry was examined by the Indian Sugar Committee (1920), out of the 22 sugar factories existing in India at that time 10 were situated in northern Bihar and 5 in the United Provinces; 3 out of these 5 were located on the borders of Bihar in the district of Gorakhpur. At the time of the grant of protection to the sugar industry in 1932, out of the 31 sugar factories in the whole of India 14 were in the U. P. and 12 in Bihar. Out of the total production of 1,56,000 tons of sugar in 1931-32 the U. P. and Bihar produced 66,000 and 75,000 tons respectively, and taken together both the provinces accounted for more than 90 per cent of the total output of the whole of India.

Thus at the time of the grant of protection north Bihar and eastern U. P. formed the most important white sugar producing regions of India. The entrepreneurial ability and capital had already begun to play their respective roles in the development of sugar industry in this region. And as, at this stage, no such favourable circumstances existed in any other part of India, the United Provinces and Bihar took the fullest advantage of the

protective duty to develop the sugar industry very rapidly. By the year 1935-36 the industry had practically attained its full stature. The production of sugar in vacuum-pan factories in India reached over a million tons twice—once in 1936-37 and again in 1939-40—between 1931-32 and 1939-40. The distribution of the vacuum-pan factories in northern India in 1936-37 and in 1939-40 is given below:

TABLE XXXVI

| Province | Distribution of Vacuum-pan factories | |
|----------|--------------------------------------|---------|
| | 1936-37 | 1939-40 |
| Bengal | 6 | 9 |
| Bihar | 33 | 32 |
| U. P. | 70 | 72 |
| Punjab | 5 | 3 |

It will be seen that the number of factories has actually declined in Bihar and the Punjab and the increase in the U. P. is very small. It is only in the province of Bengal that the number of factories has increased by 50 per cent.

TABLE XXXVII

The distribution of average sugar production from 1931-32 to 1934-35 and from 1935-36 to 1938-39

| Province | Average 1931-32 to 1934-35 (In 1,000 tons) | Percentage of total production | Average 1935-36 to 1938-39 (In 1,000 tons) | Percentage of total production |
|----------|--|--------------------------------------|--|--------------------------------------|
| Bengal | 4 | 1.1 | 20 | 2.2 |
| Bihar | 132 | 36.0 | 242 | 26.8 |
| U. P. | 201 | 54.8 | 517 | 57.3 |
| Punjab | 3 | 0.8 | 15 | 1.7 |

It is significant that the percentage share of the province of Bihar declined considerably and in spite of a small rise of 2.5 per cent in the share of the U. P. the joint contribution of both the provinces to the total declined from 90.8 per cent to 84.1 per cent. On the other hand the percentage shares of both the Punjab and Bengal have doubled or more than doubled. In

the years 1940-41 and 1941-42 the production of sugar was restricted within certain specified limits by the provincial governments of the U. P. and Bihar and therefore these years do not provide a fair basis of comparison.

As regards the future trends of development in northern India there is little room for further expansion in north Bihar and eastern, central and western U. P., as not only has the industry already reached its climax in these regions but in many areas there exists even an undesirable congestion of mills. The sugar industry in the U. P. and Bihar is dependent upon other provinces and states for its market, the production of sugar in some of which is showing a steadily rising tendency. This development outside the U. P. and Bihar is likely to deprive the industry in these two provinces of some of its valuable markets. In the long run this might lead to a weeding out of some of the inefficient and unscientifically located units. During the last few years the cane development departments of the two provincial governments have done their best to assist the industry by the introduction of zoning system and by the extension of areas under improved varieties of cane. The cane development schemes have been pushed to the utmost limits. Between 1935-36 and 1938-39, on an average, 94 per cent and 90 per cent of the total area under cane in Bihar and the U.P. respectively was under improved varieties of cane. On the whole there is no scope for expansion of the industry in these two provinces.

The extreme climate of the Punjab sets a limit to the development and progress of the sugar industry in that province. But so far as the province of Bengal is concerned the length of the prevailing crushing season and the lower recovery percentage seem to be incompatible with natural conditions and it appears that the potentialities of the province in this respect have not been given a fair trial as yet. At the present time the province is producing only about 20 to 25 per cent of its total requirements and there is yet considerable room for further expansion, provided the industry is able to overcome various drawbacks on the agricultural as well as on the manufacturing side. It is remarkable to note, however, in this connexion that on account of its peculiar difficulties and problems the industry in Bengal is developing tendencies similar to those discernible in the Bombay section of the industry. Four out of the seven existing

vacuum-pan factories have acquired extensive sugar-cane plantations of their own. The areas of these plantations vary from 2,667 acres (Setabganj Sugar Mills) to 5,000 acres (Ram Naggar Cane and Sugar Co.) and they are capable of supplying from 15 to 55 per cent of the total cane requirements of the mills according to the sizes of their respective farms.

To conclude, certain changes (of different degrees) in the productive capacities of the provinces of northern India are very likely to take place in the post-war period, but the premier position of the United Provinces and Bihar will continue unchallenged.

CHAPTER IX

POSSIBILITY OF THE SHIFT OF THE SUGAR INDUSTRY TO THE SOUTH

Unlike the rest of the world, India obtains between 80 and 90 per cent of her cane sugar from the sub-tropical region, where, on account of lower temperatures prevailing during the winter months, only thin and medium varieties of canes can be grown. Peninsular India, however, lies entirely within the tropics and the climate of this region is suitable for the growth of thick varieties of canes. The superiority of these canes from the point of view of yield and quality over the canes of northern India is shown in the following table:

TABLE XXXVIII¹

| Region | Recovery of sugar per cent of cane | Maunds of cane required for pro- ducing a maund of sugar | | Average yield per acre (tons of sugar) | Estimates of tons of sugar per acre | |
|-------------------|---|---|----------------------|--|---|--------------------|
| | 1935-36 | 1935-36 | 1936-37 | | 1935-36 | 1936-37 |
| | 1936-37 | 1935-36 | 1936-37 | | 1935-36 | 1936-37 |
| Tropical | | | | | | |
| Bombay | ... | 9.55 | 9.36 | 40 to 42 | 2.93 | 2.78 |
| Madras | 10.5 | 10.94 | 10.99 | 20 to 35 | 2.92 | 2.55 |
| Sub-tro- pical | 9.5 | 11.20 to 12.71 | 10.36 to 11.57 | 12 to 18 to • 1.47 | 0.63 to 1.47 | 0.71 to 1.47 |

It will be seen that the recovery of sugar per cent weight of cane is higher by one per cent in the tropical region in comparison with the sub-tropical zone and the average yield per acre in the former is more than double of that in the latter, with the result that the estimated output of sugar per acre in the tropical areas is two to three times as high as in the sub-tropical region.

In spite of this superiority of the tropical region over the sub-tropical zone the contribution of the former to the total

¹ The figures given in this table have been taken from the Report of the Indian Tariff Board on Sugar (1938).

output of white crystal sugar has ranged from 10 to 20 per cent between the years 1931-32 and 1939-40. The main reason for this apparently anomalous position has been the comparatively high cost of cultivation of cane in the tropical region. The average cost of production of sugar cane per maund for the tropical and the sub-tropical region was estimated by the Indian Tariff Board on Sugar (1938) at 5 as. 5 pies and 3 as. 7 pies respectively.

The rainfall in India as a whole is deficient, seasonal and irregular and, therefore, irrigation is a necessity in the south as well as in the north for raising a successful crop of sugar-cane. But on account of the existence of snow-fed rivers and the level nature of the plains the construction of extensive canal systems is easy and cheap in the north and consequently the irrigation charges per acre in this region are not more than Rs. 10 or 11. Besides this sugar-cane is grown without irrigation in the most important sugar-cane belt of the north comprising the districts of eastern U. P. and north Bihar. In northern, eastern and central Bengal also the sugar-cane is grown without irrigation.

But southern India is a plateau, dissected by numerous rivers and on account of the uneven nature of the land the construction of canals on any extensive scale comparable to the canals of the Punjab and the U. P. is impossible. Secondly, in the absence of snow fed rivers, the provision of irrigation channels, wherever possible, is mostly dependent upon costly storage works. On account of these difficulties the irrigation charges throughout southern India are high. In the Bombay Deccan the irrigation charges per acre for over a year on major canals are as high as Rs. 60.

In addition to these irrigation charges considerable amounts have to be spent in the south on the preparation of the soil. In the north the remarkable properties of the alluvium of the Indo-Gangetic plains reduce the dependence on artificial manures to a very great extent. But in the south, on the contrary, considerable sums have to be spent on manuring. Thus the irrigation charges and the cost of manures are the two most important elements that raise the cost of production in the south in general.² But for assessing the potentialities of the future development

2 For a comparison of some of the important items of cost of production in the sub-tropical and the tropical regions, the following figures for two important typical districts (representing the conditions in the North and the South) may be given here: (See *foot note table overleaf*).

of the sugar industry in the south a slightly more detailed consideration of the characteristics of soil and climate of the different provinces and states of peninsular India is essential.

At the time of the grant of protection to the sugar industry in 1932, the province of Madras was the most important in south India from the point of view of sugar-cane acreage. The main sugar-cane producing region of this province consists of the coast districts of northern Madras. These districts may get over 47 inches of rainfall annually. The deltas of the rivers Godavari and Kistna, included in these districts, possess rich soils, chiefly formed by the mixed alluvium washed from the hills and uplands. They are also well served by the delta canals and the irrigation charges are very moderate. There is no part of India, except possibly the Deccan canal tract of Bombay, in which cane can be grown with greater profit than in this region of Madras.³

The tropical canes thrive to perfection in a warm moist climate, with moderate intervals of hot dry weather, tempered by refreshing sea-breezes. The most luxuriant development of these canes is to be observed only on islands and sea-coasts within the tropics.⁴ The climatic conditions of this coastal region of Madras are very similar to those given above and the abundant irrigation and rich soil coupled with forcing heat cause the canes to grow to a great height, sometimes up to 25 feet. The majority of the factories of the province of Madras are situated in this region. The cost of cultivation is low but the chief difficulty of these coastal districts is their liability to very violent cyclonic storms during the period of growth of the cane. They often cause severe damage to the crop if the canes are not propped

| District | Rent | Manure | Irrigation | Yield per acre(md.) | Cost of cane per md. |
|------------|-----------|-----------|------------|---------------------|----------------------|
| | Rs. a. p. | Rs. a. p. | Rs. a. p. | | Rs. a. p. |
| Gorakhpur | 12 0 0 | 29 5 3 | .... | 811 | 0 3 6 |
| Ahmednagar | 30 0 0 | 174 0 0 | 84 0 0 | 1,225 | 0 5 4 |

³ Report of the Indian Sugar Committee (1920), p. 151.

⁴ As mentioned in the previous chapter, the indigenous thin canes of Northern India are said to have been evolved from wild grasses in the South-Eastern corner of the mainland of Asia probably round the head of the Bay of Bengal. But the noble canes of the South, more strictly tropical, originated independently and from a different though related species somewhere in the Pacific islands. They were introduced into Southern India at some unknown date. (Indian Sugar, November, 1939, p. 54).

or wrapped to prevent lodging. Five thousand bamboos are required per acre for this purpose and allowing for the fact that two-thirds of the bamboos can be used again in the second season the additional cost may be estimated at Rs. 80 per acre.⁵

The southern districts of the east coast region may get about 35 inches of rain, the major part of which is received during the winter by the north-east monsoon. During the south-west monsoon period the rainfall is very light and the district of Tinnevelly may not get more than 4 inches and artificial irrigation becomes a necessity.

The central tract (including the Deccan famine zone districts) receives on an average only about 26 inches of rain and even that is precarious and badly distributed. On account of such uneven distribution of precipitation, locally and periodically, practically the whole of the sugar-cane crop is grown under irrigation, facilities for which are very limited. In the southern districts tanks and wells are the chief source of water-supply for irrigation while in the central tract small tanks are the only means available for irrigation in most of the areas. Limited acreage in these regions is now commanded by the Cauvery, Mettur and Periyar irrigation projects. In the western coastal districts the rainfall is over 100 inches but these districts grow little cane as they are better suited for the cultivation of rice.

So the main difficulty of the province is the lack of irrigation facilities but even in those areas where irrigation is possible, the farmer has the choice of a number of cash crops like the ground-nuts, cotton, plantains, chillies, and tobacco, to which he can turn apart from the staple food crop, paddy, for which he has a traditional pre~~g~~ilection. The main reasons for the preference shown by the cultivator for rice is the absolute certainty of the crop and the ease with which it can be grown.

On account of these factors the percentage of the area under cane to the total cultivated area has always been very low and sugar factories cannot obtain sufficient cane unless it is grown on land under their own control. The average percentage

5 In this connexion the Report of the Sugar Enquiry Sub-Committee on Sugar Industry in Bengal (Vol. I, p. 32) says: 'During our inspection tours in the region of the Godavari delta, we found that out of Rs. 300 required for growing sugar-cane in an area of one acre in this area, Rs. 150 is required for wrapping and propping only of the canes against violent breezes....'

of the area under cane to the total cultivated area for five years from 1935-36 to 1939-40 was 0.40 only.

The adjacent plateau of Mysore is from 2,000 to 3,000 feet high and, therefore, the extremes of temperature do not exist there. The rainfall is well distributed and the rainy season lasts from June to November. But the total amount of rain outside Malnad is not sufficient for growing cane without irrigation. The rainfall in most of the cane growing areas of the State ranges from 25 to 40 inches and the extension of the area under cane is limited by the provision of storage works. The main sugar-cane region is situated in the Irwin Canal tract, commanded by the Krishnaraja Sagar reservoir. The irrigation facilities available in the Chitaldrug and Shimoga districts are very limited. The percentage of the area under cane to the total area cultivated on an average (1935-36 to 1939-40) was 0.8 only.

In the neighbouring State of Hyderabad, the north-eastern and south-western parts are suitable for the growth of cane. The rainfall in the north-east is about 40 inches and the climate from March to September is hot and damp and temperate for the rest of the year. The cultivation of cane is possible only with the help of irrigation for which there are limited facilities in Medak, Nizamabad and Karimnagar districts. In the south-east the rainfall is only about 22 inches but some irrigation facilities are provided by the Tungabhadra canals in the Raichur district. The percentage of the area under sugar-cane to the total cultivated area on an average (1935-36 to 1939-40) was as low as 0.2.

From the point of view of the production of crystal sugar the province of Bombay occupies the most important position in the whole of the peninsular India. The major part of the total amount of sugar produced in this province comes from the region known as 'the Bombay Deccan'. This region consists of a plateau varying from 800 to 2,000 feet in height. Average rainfall varies from 20 to 30 inches and the cane is grown entirely under irrigation. The upper courses of the rivers Godavari and Kistna and their tributaries like the Pravara, the Mutha and the Nira have all been tapped to provide limited irrigation facilities in the districts of Ahmednagar, Nasik, Poona, Sholapur and Satara. The soil of this region is of volcanic origin, formed by the weathering of the Deccan trap. At a distance varying from a few inches to about six feet there is a substratum of a porous

nature. Wherever it exists within two or three feet of the surface, an excellent under-drainage is provided. But in places where this substratum is found at a greater depth than this, the drainage is poor and there is the danger of water-logging and salt-efflorescence. Cane can be successfully cultivated only if the supply of water is strictly controlled. In spite of the over-strict regulations of the irrigation department of the Government of Bombay, water-logging and salt-efflorescence have during the last forty years rendered unfit for cultivation nearly 35 per cent of the irrigable area on the older canals.

Although this region is situated entirely within the tropics, the sugar-cane crops in the northernmost part (with an elevation from 1,600 to 1,800 ft.) are liable to be damaged by occasional frosts. In 1929 the damage to cane by a severe frost amounted to 27 per cent of the crop and in two later years the loss was estimated at between 5 and 10 per cent. The percentage of the area under cane in the province of Bombay to the total area cultivated, on an average, (1935-36 to 1939-40) was 0.3 only.

The lower percentage of sugar-cane acreage in the Bombay Province indicates that the sugar-cane areas are too scattered about for a modern sugar factory to rely upon the cane supplies obtainable from the fields of the cultivators. Consequently most of the factories in the Bombay Deccan grow the whole, or the major portion of their cane requirements and operate their own tramway systems to transport it.

The preceding survey of the climatic conditions in the different provinces and states of peninsular India shows that there is no cold season and frost to restrict the growth of the cane in the south except in the extreme north of the Bombay province. On account of the extremes of the climate, the planting season in the main sugar-cane belt of northern India is confined to two or three months from February to April. But in southern India the climate is so favourable that the cane can be planted practically throughout the year. In the province of Bombay and the Mysore State there are two definite planting seasons: the *adsali* crop is planted in June and July while the *plant* cane is planted mostly in January. In the province of Madras the planting season extends from March to September. Usually the cane is planted in March and April, but in Bellary, Ganjam and the upland tracts of the Godavari the crop is planted in May and June. In the Coimbatore district there is also a second planting season

lasting from July to September. The climate enables the adsali crop to remain on the ground for nearly 18 months without flowering and thus to receive the benefit of two successive monsoons. Under favourable conditions the plant and the adsali crops can give from 45 to 55 and from 70 to 80 tons of cane per acre respectively. These yields are more than double of what may be expected in northern India.

On account of climatic factors the crushing season is also much longer in the tropical region than in the north. According to the Report of the Tariff Board (1938), the average of the actual number of working days of the central sugar factories for three years for the tropical region was 132 days as against 128 days for the sub-tropical region. One or two factories in the Bombay Deccan worked in 1935-36 for as many as 180 days and a factory in the Mysore State carried on the work of crushing for 264 days.⁶ The following table showing the average monthly cane crushings based on the quantities of cane crushed in typical factories during the four years from 1935-36 to 1938-39, gives a fair idea of the crushing season in different parts of the country:

TABLE XXXIX
Percentages of cane crushed in different months⁷

| Months | Sub-tropical region | | | | | Tropical region | | |
|---------------|---------------------|--------------|--------------|------|--------|-----------------|--------|--------|
| | Punjab | Western U.P. | Eastern U.P. | Etah | Bengal | Bombay | Madras | Mysore |
| October | ... | ... | ... | ... | ... | 6.8 | ... | 9.6 |
| November | 13.5 | 10.7 | 2.2 | 2.8 | 1.6 | 12.8 | 1.4 | 11.7 |
| December | 26.5 | 22.1 | 19.7 | 19.4 | 23.5 | 15.9 | 3.2 | 6.2 |
| January | 28.1 | 22.7 | 28.2 | 22.2 | 26.2 | 15.4 | 17.1 | 5.5 |
| February | 18.7 | 19.5 | 20.1 | 21.0 | 21.6 | 14.6 | 22.4 | 11.2 |
| March | 13.2 | 15.9 | 19.7 | 20.9 | 16.8 | 15.1 | 24.0 | 12.0 |
| April | ... | 7.8 | 9.5 | 8.2 | 8.7 | 12.3 | 18.8 | 10.7 |
| May | ... | 1.3 | 0.6 | 5.5 | 1.6 | 6.8 | 12.8 | 9.2 |
| June to Sept. | ... | ... | ... | ... | ... | 0.3 | 0.3 | 23.3 |
| | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |

The table shows that the crushing season in the north is confined to five or six months between November and April and the

⁶ Report of the Indian Tariff Board on Sugar (1938), p. 61.

⁷ Report on the Marketing of Sugar in India and Burma (1943), p. 93.

major part of the total quantities of the cane used is crushed between December and March. During these four months there is a virtual congestion of cane and in spite of the fact that some of the mills sometimes crush more than their declared capacities during this period, cultivators continue to remain anxious for getting more *purjis* (requisition slips). In the remaining months of the season the mill machinery is utilized only partially. For profitable manufacture of sugar the mills require a uniform and longer crushing and an even supply of cane spread over the entire season, which is not possible in the north.

There are considerable difficulties in extending the season beyond April 20 in the sub-tropical region, because after that date cane diseases become rampant and there is loss due to the drying up of cane. Besides, if the season is prolonged, the cultivator is unable to grow another crop on the land for eight months.⁸

In the south, on the other hand, the season is much longer. The crushing of the total amount of cane is spread very uniformly over seven or eight months. The factories in the Bombay Deccan combine a fresh adsali crop with a ratoon crop and find it possible to extend their season from October to April or May. Moreover, the higher proportion of factory and gate cane in the south gives the factories greater command over the entire quantity of cane to regulate their supplies according to their requirements. The position of the northern and the southern regions in this respect is as follows:

TABLE XL

| Region | Percentage of total cane crushed | | |
|------------------------|----------------------------------|-----------|-----------|
| | Factory Cane | Gate Cane | Rail Cane |
| Northern Region | | | |
| North-Eastern | | | |
| U. P. | ... | 5 | 70 |
| North Bihar | ... | 3 | 55 |
| Southern Region | | | |
| Bombay | ... | 85 | 15 |
| Madras | ... | 5 | 67 |

The position of the province of Bombay is unique in this respect in the whole of India, as 85 per cent of the cane is grown

⁸ Report of the Indian Tariff Board on Sugar (1938), p. 61.

on the factory farms and the remaining 15 per cent is received fresh at the gate. The position of Madras is as good as that of north-eastern U. P. and is much better than that of north Bihar. The percentages of 'rail-cane', however, do not disclose a disparity between the North and the South clearly, as the average distances for such cane in the South are much less than in the north. The average lead in 1937-38 in the case of the Mysore factory was only 10 miles while in the case of the U. P. and Bihar it was about 40 miles. A number of factories in Bihar import cane from the south-eastern districts of the U. P. from a distance of 100 to 150 miles. The higher production of factory and gate cane is important from the point of view of recovery because the factory cane is of a superior quality and the gate cane is generally fresh. Factory's own cane is again important from the point of view of general working of the mills because it can be made available as and when best required for regulating the cane supplies and for prolonging the length of the crushing season.

A longer crushing season, besides reducing the incidence of the overhead charges is helpful for the establishment of subsidiary industries for the utilization of by-products and for maintaining and increasing the efficiency of the technical staff. While speaking at the 12th Annual Convention of Sugar Technologists of India, at the Imperial Institute of Sugar Technology, Cawnpore, on October 21, 1943, Mr Walchand Hirachand observed: 'By starting subsidiary industries for by-products the factories of Deccan have found it possible to keep the whole of their technical staff engaged throughout the year. In the north the factories remain entirely closed during the off season as there is nothing else to be done except cleaning of machinery which requires only a few days.'

There are indications of certain other important developments in the tropical region. Some of the factories crush locally available groundnuts to obtain oil-cakes for use as manure on their farms. The groundnut oil is turned into vegetable ghee by installing hydrogenation plants.⁹ In certain cases surplus cakes along with cane tops are utilized as a basis for starting

⁹ In northern India there is no example of a similar development. At Modinagar (near Begamabad in the Meerut district) sugar, oil, vegetable ghee, and biscuit factories have been grouped together by their proprietor, R. B. Gujar Mal Modi.

dairies, the products of which find a ready market in the military centres of the neighbouring areas where foreign and Indian troops are stationed. Some people are very hopeful and optimistic about the future of these trends and assert that these sugar factories are destined to become one day regional centres of the future industrial development of the rural areas of the Deccan peninsula. Such developments are possible in the south because the operations of the main sugar industry extend practically over nine months of the year from October to May and the off season is very short. But in the north, where the off season is considerably longer than the busy season, similar development may not be a practical and paying proposition.

From the point of view of markets and the demand for sugar also the tropical region stands in a better position than the sub-tropical region. Average production and consumption of sugar in the different trade blocks of the north and the south is given in TABLE XLI overleaf.¹⁰

The statistics of production and consumption show that in the north there is a surplus production of about 2,00,000 tons of which about 1,70,000 tons finds market in the south. In the tropical region on the other hand there is a deficit of about 2,60,000 tons which is made good by obtaining 1,70,000 tons from the north and by importing about 90,000 tons from abroad. The existence of this wide gap between production and consumption acts as an incentive for further developing the sugar industry in the south. Besides this, certain regions of peninsular India like the north-east coast districts of Madras and Bombay Deccan are in a better position to export sugar to foreign markets if some outlet is found for Indian sugar in the post-war period.

On account of superior climatic conditions, the output of sugar-cane per acre and the recovery percentage are higher in the tropical region than in the sub-tropical region. The extent

10 Imports from Overseas

| | | 23 Thousand tons |
|------------------------------------|------|------------------|
| Sind | .... |  |
| Bengal | ... | 17 |
| Madras | .... | 20 |
| Bombay | .... | 73 |
| | | — 133 |
| Less exports to adjacent countries | | 27 |
| Net Imports | | 106 |

TABLE XLI

Estimated total production and net supplies of sugar available for consumption (average 1935-36 to 1938-39)
(In thousand tons)

| Trade Blocks | Production | | | Total | Net supplies available for consumption |
|---|------------|------------------------|------------------|-------|--|
| | Cane sugar | Sugar refined from gur | Khand-sari sugar | | |
| N.-W. F. P. | ... | ... | ... | ... | 20 |
| Punjab (including Kashmir and Delhi) | 15 | 3 | 1 | 19 | 203 |
| U. P. | 517 | 13 | 129 | 659 | 192 |
| Bihar | 242 | ... | 4 | 246 | 56 |
| Bengal | 20 | ... | 2 | 22 | 150 |
| Assam | ... | ... | ... | ... | 17 |
| Sind | 2 | ... | ... | 2 | 42 |
| C. I. | 5 | ... | 1 | 6 | 30 |
| Rajputana | 1 | ... | ... | 1 | 48 |
| C. P. | ... | ... | ... | ... | 41 |
| Total (Northern India) | 802 | 16 | 137 | 955 | 799 |
| Madras | 20 | 10 | ... | 30 | 100 |
| Bombay | 53 | ... | ... | 53 | 227 |
| Mysore | 25 | ... | ... | 25 | 9 |
| Hyderabad | 1 | ... | ... | 1 | 27 |
| Orissa | 1 | ... | ... | 1 | 9 |
| Total (Southern India) | 100 | 10 | ... | 110 | 372 |
| Grand Total | 902 | 26 | 137 | 1,065 | 1,171 |
| Net imports ¹¹ | | | | 106 | |
| | | | | | 1,171 |
| | | | | | 1,171 |

¹¹ Report on the Marketing of Sugar in India and Burma (1943), Appendix XXXVII.

of demand in the local markets is also more favourable for the sugar industry in the south in comparison with the north. In spite of these favourable factors the sugar mills in peninsular India have not been able to raise their production to satisfy the demand in that region. Two factors have been mainly responsible for their inability to do so.

First, as pointed out earlier, the cost of cultivation in the tropical region is comparatively high. The industry is, however, trying to overcome this obstacle by increasing the output of sugar-cane per acre. The average yield of sugar-cane per acre, as shown in TABLE XXXVIII was higher in the south than in the north even before 1938, and in the case of certain farms and factories exceptionally high yields were being obtained. In this connexion the Report of the Tariff Board (1938), observes: 'A factory in Bombay Deccan which obtained a yield of 1.86 tons (of sugar) in 1924-25 and 3.51 tons in 1930-31, is now able to get 4.70 tons per acre. In an experimental plot in the Deccan canal area a yield of 100 tons of cane per acre has been obtained which should give at least 11 tons of sugar with a recovery of 11 per cent.'¹²

These results achieved in the south earlier than 1938 have to be viewed, however, in the light of the fact that the research on thin varieties of cane was started at Coimbatore as early as 1912 and by 1938 improved varieties of cane had already been introduced into the major part of the sub-tropical region. But the research on 'thick' or 'noble' varieties was taken up only in 1926—the first improved thick variety was not evolved until 1930—and the new types had not been completely tested or released for general cultivation in the tropical region up to 1937-38.

Regarding the possibilities of increase in the output of cane and the chances of reduction in its cost of production the Tariff Board (1938) remarked: 'Allowing for some climatic advantage the possibilities of general improvement in the tonnage and quality are greater in the south than in the north and an equalization of cost of production is, according to expert opinion, feasible at no distant date.' This was a very significant remark because after the establishment of parity between the cost of production in the north and the south, the superiority of the tropical region in the production of cheap sugar cannot be held in doubt any more.

¹² Report of the Indian Tariff Board on Sugar (1938), p. 67.

The trend of development on the agricultural side of the sugar industry of the south since then shows that the expectations of the Tariff Board were fully justified. Canes of high calibre evolved in 1933 and 1934 are working wonders. Co. 419 has not only given higher yields than Pundia, J 247 and Stripped Mauritius but has also out-yielded POJ 2878, the wonder cane of Java, which trebled the yield per acre in that country. According to Mr R. D. Rege, Crop Physiologist and Principal Agricultural Officer, Sugar-cane Research Scheme, Padegaon (Bombay), tonnage equal to 110 tons per acre have been obtained with Co. 419 in adsali (June-July) planting in certain areas, whilst an average of 60 to 70 tons per acre is a very common figure. Varieties Co. 421 and Co. 419 were found to yield respectively 44 and 55 tons of cane per acre at Anakapalle in Madras in 1937-38; at Gudiyatam in the same area Co. 248 and Co. 419 yielded 59 and 57 tons respectively.¹³ As against these the latest varieties like Co. 421 are not giving more than 35 tons per acre in northern India.¹⁴

On account of such high yields given by new varieties in the south, the cost of production of sugar-cane in that region is coming down. According to Mr N. L. Dutta, Government Sugar-cane Expert, Imperial Sugar-cane Station, Coimbatore, it was found at one of the experimental stations in Madras that the cost of Co. 419 was Rs. 6 per ton (equal to about 3 as. 6 pies per maund of 82 lbs.) against Rs. 8 or 9 per ton of J 247 and POJ 2878 respectively.¹⁵ Owing to these remarkable qualities Co. 419 has already become one of the outstanding canes in Bombay Deccan. In Madras it is becoming the prime favourite in several areas.

Besides the increase in yield, economies in the cost of production of cane appear to be likely in certain other directions also. The latest researches show that over-manuring and over-irrigation are generally done and that the best results are possible with reduced quantities of manure and water. The irrigation charges and the price of manure are the heaviest items in the total cost of production of sugar-cane in the south and, if it is found possible to reduce these items to reasonable limits, there is no doubt that this region will be able to produce sugar-cane

¹³ *Indian Farming*, August 1942, pp. 426-27.

¹⁴ *Indian Sugar*, November 1942, p. 403.

¹⁵ *Ibid.*

as cheaply as any of the regions in the north is capable of doing.

The second and the only remaining obstacle in the path of progress of the sugar industry in the tropical region has been the lack of irrigation facilities. The percentages of the cane area under irrigation given in the following table show the comparative importance of artificial irrigation in the north and the south.

TABLE XLII

| Region | Percentage of cane area under irrigation (Average 1935-36 to 1938-39) | |
|----------------|---|-----|
| Northern India | | |
| Lowest—Bengal | ... | 10 |
| Highest—Punjab | ... | 82 |
| Southern India | | |
| Lowest—Madras | ... | 95 |
| Bombay | ... | 98 |
| Highest—Mysore | ... | 100 |
| Hyderabad | ... | 100 |

The percentages for southern India clearly indicate that the cultivation of sugar-cane without irrigation is practically impossible in this region, and therefore the extension of area under cane is entirely dependent upon the extension of the facilities for artificial irrigation. On account of the difficulties of alignment and lack of water, the progress in the provision of irrigation facilities has been necessarily slow and consequently the progress of the sugar industry in the tropical region has not been so rapid as in the north. The distribution and comparative growth of the sugar industry in northern and southern India are shown in TABLES XLIII and XLIV overleaf.

The number of factories in southern India in 1931-32 shows that at the time of the grant of protection the sugar industry in that region existed only in the form of a nucleus and, on account of the scattered nature of the sugar-cane acreage, was not in a position to take advantage of the opportunities offered by the protective duty for such a rapid development of the industry as took place in the north. In spite of difficulties, however, the production of sugar has made good progress. During the period

TABLE XLIII

The distribution of vacuum-pan factories

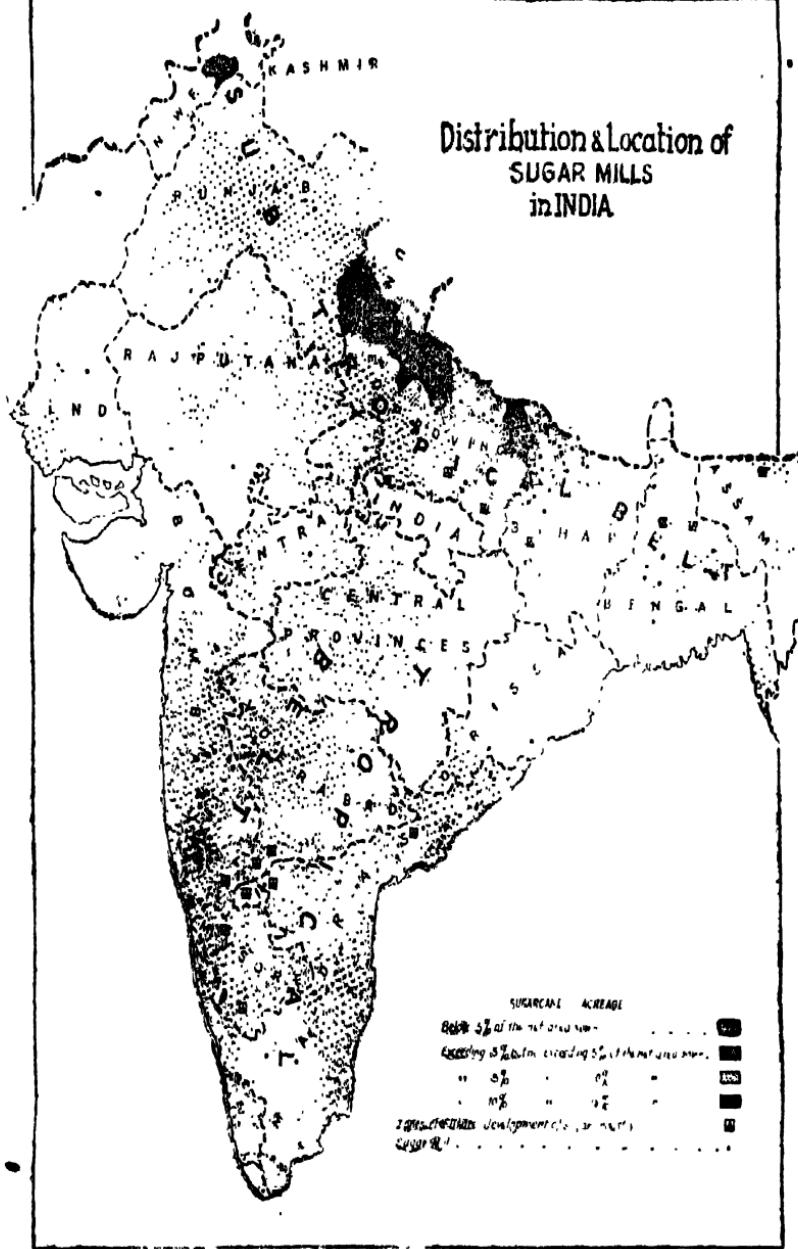
| Region | Number of factories | | | | | |
|----------------|---------------------|-------|---------|-------|---------|-------|
| | 1931-32 | | 1936-37 | | 1939-40 | |
| | Details | Total | Details | Total | Details | Total |
| Northern India | ... | 27 | | 118 | | 121 |
| Southern India | | | | | | |
| Madras | ... | 1 | | 10 | | 10 |
| Bombay | ... | 2 | | 8 | | 10 |
| Mysore | ... | ... | | 1 | | 1 |
| Hyderabad | ... | ... | | ... | | 1 |
| Orissa | ... | 1 | 4 | 1 | 20 | 24 |
| | | 31 | | 138 | | 145 |

TABLE XLIV

*The regional distribution of the total output of white sugar
(In thousand tons)*

| Region | Average (1931-32 to 1934-35) | | Percentage of the all-India total | Average (1935-36 to 1938-39) | | Percentage of the all-India total |
|----------------|------------------------------------|-------|--|------------------------------------|-------|--|
| | Details | Total | | Details | Total | |
| Northern India | ... | 340 | 92.6 | | 802 | 88.9 |
| Southern India | | | | | | |
| Madras | ... | 9 | 2.5 | 20 | | 2.2 |
| Bombay | ... | 14 | 3.8 | 53 | | 5.9 |
| Mysore | ... | 3 | 0.8 | 25 | | 2.8 |
| Hyderabad | ... | ... | ... | 1 | | 0.1 |
| Orissa | ... | 1 | 0.3 | 100 | | 0.1 |
| | | 367 | 100.0 | | 902 | 100.0 |

Distribution & Location of SUGAR MILLS in INDIA



under review the percentage share of southern India has risen from 7·4 to 11·1, and the average annual production has practically quadrupled. During the same period the percentage share of northern India has declined from 92·6 to 88·9, although the average annual production has become almost double. The trends of the production of sugar since then in the north and in the south are shown in the following table:

TABLE XLV

| Region | Production in thousand tons | | |
|------------------------------------|-----------------------------|-----------------|-----------------|
| | 1939-40 | 1942-43 | 1943-44 |
| Northern India - | | | |
| N.W. F. P. | | 3·17 | 6·25 |
| Sind | 3·02 | 2·01 | — |
| Punjab (with States) | 19·59 | 10·83 | 28·34 |
| U. P. (with States) | 676·43 | 634·33 | 759·44 |
| Bihar | 315·48 | 237·67 | 312·81 |
| Bengal | 30·87 | 16·54 | 13·65 |
| Assam | 0·04 | — | — |
| C. I. | 7·43 | 7·18 | 12·17 |
| Rajputana | 1·96 | 1·15 | 2·18 |
| | 1,063·82 | 913·18 | 1,034·84 |
| Southern India | | | |
| Madras ¹⁶ (with States) | 43·21 | 33·72 | 46·09 |
| Bombay (with States) | 91·06 | 96·26 | 102·25 |
| Mysore | 30·60 | 16·21 | 20·23 |
| Hyderabad | 10·45 | 12·30 | 17·47 |
| Orissa | 2·32 | 2·09 | 1·69 |
| | 177·64 | 160·58 | 187·73 |
| Others | — | 0·00 | 0·00 |
| All-India Total | 1,241·16 | 1,073·85 | 1,223·56 |
| Percentage Share | | | |
| Northern India - | | | |
| U. P. & Bihar | 79·8 | 81·2 | 79·4 |
| Other areas | 5·9 | 3·8 | 5·2 |
| | 85·7 | 85·0 | 84·6 |
| Southern India | | | |
| | 14·3 | 15·0 | 15·4 |
| | 100·0 | 100·0 | 100·0 |

The production of sugar in the different provinces after 1939-40 does not provide a fair basis of comparison, because the production in the U. P. and Bihar during the years 1940-41 and 1941-42 was fixed by the provincial governments, and after

¹⁶ Production from gur and jaggery included.

that the production in some of the provinces like Bombay has been considerably affected by the 'Grow More Food' policy of the Government. But in spite of that, the progressive trend of production in the south, especially in the province of Bombay, is very significant. As the potentialities of the tropical region are being developed and the obstacles are being overcome the production is increasing steadily. In normal times in the post-war period, the province of Madras (including States), and the States of Mysore and Hyderabad are likely to produce enough sugar to meet the entire requirements of these areas¹⁷ and similarly the province of Bombay (including States) may also produce more than 1,00,000 tons of sugar. This increase in the production of the tropical region will restrict the markets of the industry of the U. P. and Bihar in that region considerably. If the normal pre-war quantity of nearly 93,000 tons is received as imports from abroad in the post-war period also, the industry in the U. P. and Bihar may not find it possible to market in the south more than 50,000 tons of sugar in place of nearly 1,70,000 tons disposed of there in the pre-war days. It would mean a loss of market nearly to the extent of 1,20,000 tons and would be a serious blow to the industry of the north.

These estimates do not take into account any fresh developments beyond 1942, and there is considerable scope for further progress. The chances of extension of irrigation facilities in the tropical region in the post-war period appear to be fairly good. The intentions of the Government of Bombay with regard to the extension of irrigation facilities in connexion with the plan of the

17 The total normal demand for sugar in the province of Madras and the States of Mysore and Hyderabad taken together may be estimated at 1,36,000 tons. Mr B. L. Green (Madras) gave the following estimates of the possible development of sugar production by 1942, at the Sugar Conference (June 1940):

| | |
|--------------------------------|---------------|
| Estimated production in Madras | 60,570 tons |
| Mysore | 31,000 tons |
| Hyderabad | 15,000 tons |
| | 1,06,570 tons |

Besides this Messrs Parry & Co., Ltd., Managing Agents of the East India Distilleries & Sugar Factories, Ltd., Nellikuppam, and the Deccan Sugar & Akbari Co., Ltd., Samalkota, are of the opinion that within two or three years the region represented by the province of Madras (including States) and the States of Mysore and Hyderabad will be producing enough sugar to meet the entire requirements of the region.

post-war agricultural development are already well known. The question of the utilization of the waters of the river Tungabhadra which was engaging the attention of the governments concerned, has now been settled.¹⁸ As a result of this settlement, two dams on the rivers Tunga and Bhadra may provide additional irrigation facilities to an area of about 1,20,000 acres in the Mysore State. A part of this land may be put under sugar-cane, and another sugar factory in northern Mysore, like the one at Mandya, may come into existence. A lake (138 miles in extent) formed by a dam across the river Tungabhadra at Malapuram, near Hospet, may provide irrigation facilities for 3,00,000 acres of land in the Bellary and Kurnool districts in the Madras Presidency. On the Hyderabad side an area of about 7,00,000 acres may also be brought under irrigation.

These new developments may bring into existence another important sugar producing region, similar to the Bombay Deccan, in an area comprising the southern districts of Bombay, northern Mysore, south-western Hyderabad and the Ceded Districts of Madras. The construction of another big dam—about a mile long—across the river Godavari at Polavaram, 30 miles up from Rajahmundry is also being taken up by the Government of Madras. The irrigation facilities provided by this project in the Godavari district may help the future development of sugar industry in the north-eastern districts of Madras. The hydro-electric grid pumping schemes of the Bombay Presidency, if extended into the Bombay Deccan, may also enable the sugar industry in this region to make further progress. Although it is not possible to give any exact estimates of the increase in the production of sugar in the tropical region, it can safely be said that these developments will result in considerable changes in the regional distribution of the sugar industry of India in the long run, because the financial success of most of the irrigation projects, in these parts of peninsular India largely depends on sugar-cane cultivation in at least a part of the area brought under irrigation by the new schemes.

¹⁸ Work on the seven-crore Irrigation-cum-Power Tungabhadra Project has been started by the Provincial Government. The project is now being carried out on either bank of the river—the Madras side of the river and the Hyderabad side. Concurrently the Government of Madras have begun digging a canal 200 miles long to irrigate three lakhs of acres in the surrounding areas. The Hyderabad Government have also undertaken the digging of a similar canal on their side of the river.

The problems of the regional redistribution of the sugar industry are not confined to certain adjustments between the tropical and the sub-tropical regions only. The early establishment of the sugar industry in the U. P. and Bihar, its subsequent spread into other provinces of India in the south as well as in the north, and its recent movements into the Indian states, suggests a repetition of the history of the cotton industry discussed in the second and the third chapters. The increase in the total production of sugar in the Indian states, as shown by the following figures, has been very rapid:

TABLE. XLVI

Quantities of sugar produced in the Indian States

| Year | Tons | Year | Tons |
|---------|--------|---------|----------|
| 1934-35 | 18,000 | 1939-40 | 1,03,000 |
| 1935-36 | 58,000 | 1940-41 | 1,30,000 |
| 1936-37 | 75,000 | 1941-42 | 1,16,200 |
| 1937-38 | 80,000 | 1942-43 | 85,000 |
| 1938-39 | 76,000 | 1943-44 | 1,23,800 |

The movement of sugar industry to some of the Indian States of Central India and Rajputana, where the climatic and other conditions are far from being favourable for the growth of the sugar industry, is based on factors similar to those mentioned in connexion with the cotton industry.¹⁹

Certain changes in the distribution of the sugar industry inside the sub-tropical region itself are likely. The post-war

¹⁹ Recently a sugar company has been floated in Dewas State, with the active assistance of the State Government. Of the total issued capital of Rs. 15 lakhs, 5 lakhs has been guaranteed by the Government; the State would, if necessary, contribute a further 5 lakhs of rupees capital after two years. The Government has also granted various valuable concessions to the company. It has helped the company to acquire 6,000 acres of land on twenty year lease. The State would levy no royalty, tax or additional rates, on the use of the river water by the company. No new sugar factory would be permitted within the territory of the State for the next 20 years. If and when the need for another factory in the State arose, the Malwa Sugar Co., Ltd. would receive the first option to put up another factory; any other concern would be allowed to start a new factory only if the Malwa Sugar Co., Ltd. did not exercise this option. The State Government might impose an excise duty on the sugar produced by the company, at the rate prevailing in British India; 50 per cent of the proceeds of the duty would,

plans of the governments of the U. P. and Bihar for extending the facilities of tube-well irrigation in the Allahabad and Benares divisions of the U. P. and in south Bihar may result in considerable increase in the sugar-cane acreage in these areas and the availability of additional supplies of cane may attract a few more sugar mills to these parts, although the interests of the sugar industry of these provinces will be best served by shifting some of the units from the congested areas to these parts rather than by erecting new factories. Besides, there is also a possibility of further increase in the production of sugar in the province of Bengal,²⁰ as it is felt there that the conditions are favourable for starting some more mills in the cane growing districts of the province.²¹

The regional distribution of the sugar industry became a controversial question just after the grant of protection to the industry in the year 1932. The sugar interests in the U. P. and Bihar began to plead for the regulation of the sugar industry on an all-India basis as early as 1933. A resolution to this effect was placed before the Sugar Conference, (1933), by the Hon. K. B. Saiyid M. Hussain, but the move was opposed by a majority of the delegates from the remaining parts of India.²² Mr B. L. Green from Madras adopted the latter attitude towards this problem at the next Sugar Conference, held in June 1940. He stated that Madras could not agree to any restriction or regulation of production of sugar at that stage.

however, be refunded to the company in the form of a subsidy. No tax or duty would be imposed on any materials that the company might import into the State. A duty would be levied by the Government at the rate of Re. 1 to Rs. 2 per maund on all sugar imported into the State, but no duty would be levied on the export of sugar from the State. No income-tax would be levied on the profit or income of the company so long as the State was in receipt of income from the excise duty. (*Indian Sugar Manual*, 1942, published by the Sugar Technologists' Association of India, Cawnpore, p. 203).

²⁰ The production of sugar in Bengal and Assam increased from 24,000 tons in 1936-37 to 52,000 tons in 1940-41. Since 1941-42 it has begun to go down and in 1943-44 only 13,650 tons of sugar was produced. The scarcity of food in Bengal may be partly responsible for this.

²¹ Report of the Sugar Enquiry Sub-Committee on Sugar Industry in Bengal (1942), Vol. I, p. 29.

²² Proceedings of the Sugar Conference, (July 1933), pp. 12-27. (The resolution in question was actually carried but later on the Conference decided by 12 votes to 11 that it should pass no resolutions.)

The sugar interests in the U. P. and Bihar, on the other hand, feel that the industry in these provinces, which have been the home of sugar industry since the fourth century B.C.,²³ is placed in its most natural surroundings, and as such, like jute in Bengal, sugar has become identified with the U. P. and Bihar, and so it will not be unfair to demand that sugar industry should be, more or less, limited to these two provinces.²⁴ They think that the vision of the people of other provinces, who advocate the development of sugar factories outside the U. P. and Bihar, is blurred by narrow provincial outlook.²⁵ The Indian Tariff Board on Sugar (1938) anticipated these problems and difficulties when they made the following observations: 'Public opinion, it would appear, favours an increase of internal production in provinces which at present import most of their requirements from outside. A change in the territorial distribution of production, which will work to the disadvantage of exporting areas, is a new problem on the horizon, the repercussions of which are likely to prove important in the not distant future.'²⁶

The demand of the U. P. and Bihar to limit the industry to these two provinces was as unreasonable as the desire of some of the other regions to attain self-sufficiency. The views expressed from both the sides represent the two extremes and are not in the best interests of the country. An over-concentration of the sugar industry in the U. P. and Bihar would necessarily mean heavy transportation charges over long distances and consequently considerable additions to the selling price of sugar. A scatter-up of the industry in the various regions suitable for its growth and development would be therefore advantageous to both the consumers and the manufacturers--since it is likely to reduce the selling price and to increase the demand for sugar. But the desirability of such dispersion does not mean that the attempts that are being made in some of the regions to attain self-sufficiency (sometimes even by levying import duties on sugar coming from the neighbouring regions and by granting

²³ Presidential speech of Sir A. Haroon, at the Seventh Annual General Meeting of the Indian Sugar Mills' Association, Sept. 10, 1939.

²⁴ *Indian Sugar*, (Dec. 1938), p. 12. (The Views of the Indian Sugar Syndicate.)

²⁵ *Indian Sugar*, May, 1939, p. 157 (views expressed by Lal Karam Chand Thapar, the President of the Indian Sugar Syndicate).

²⁶ Report of the Indian Tariff Board on Sugar (1938), p. 29.

subsidies) are also justifiable, when the climatic conditions of these areas are not quite favourable for such development. As suggested by Dr R. Balkrishna, in his pamphlet, *The Finance and Structure of Industry*, 'the future location of the sugar factories must be such that they would be expected to cater to a market which is confined to a reasonable radius of distribution' provided that no sugar factories are started in the areas where the cost of production is likely to be higher than the price at which the sugar produced in other regions can be sold there.

Since 1932, the sugar industry has been growing and spreading into different regions of the country, without any plan or control, inside the high tariff walls. It has had no time to consolidate itself or to improve its technical side. Up to 1939 the cost of production in India was higher and the quality of the product inferior compared to Java. At the present time, the sugar industry of the foreign competitors like Java is passing through abnormal conditions created by war and on account of the breakdown of the normal trade of the world there is no foreign competition. The Indian industry has yet to prove its ability to face foreign competition. The real test of the efficiency of different sections of the industry in different regions and of their ability to survive will come only when the present protective duty is replaced by ordinary revenue duty. There is no other section of the industry in the whole of India which is so sure of withstanding foreign competition as the factories situated in the Bombay Deccan. The manufacturers in this region are quite confident 'that in the years to come the conditions of cane cultivation and sugar manufacture will more closely approximate to those of Java than now so far.'²⁷

But in this connexion a very important factor with regard to the industry in the U. P. and Bihar should not be lost sight of. In these provinces the 'fixation of the minimum price of sugar-cane' implies interference with the operation of the ordinary laws of supply and demand, the effect of which on the production of sugar is of a far-reaching character. A price based on theoretical costing estimate is likely to be higher than the price which is a sufficient inducement to the cultivator to continue sugar-cane cultivation, since in practice he takes no account of depreciation, interest on working capital and 'insurance against

²⁷ Report of the Indian Tariff Board on Sugar (1938), Written Evidence, Vol. III, p. 402.

abnormal losses of crop, and regards a cash return equivalent to the value of his labour and the labour of his family as his profit.²⁸ Moreover, the cultivator in these provinces has come to rely on the sugar factories more than in any other region for the disposal of his sugar-cane crop. This position is very clearly illustrated by the following percentages of total sugar-cane crop used in vacuum-pan factories in different provinces and states.

TABLE XLVII

Utilization of cane in vacuum-pan factories

| Province | Percentage of the total crop used in the vacuum-pan factories (Average 1935-36 to 1938-39) |
|-------------|--|
| N.-W. F. P. | 19.3 |
| Sind | 22.3 |
| Punjab | 4.1 |
| U. P. | 18.7 |
| Bihar | 52.9 |
| Bengal | 4.4 |
| Assam | ... |
| Madras | 8.5 |
| Bombay | 19.5 |
| Mysore | 25.8 |
| Hyderabad | 1.3 |
| Orissa | 22.3 |

The percentage for Bihar is the highest; in the case of the U. P. it is lower than in southern India, but the conditions in the trans-Gogra region of this province are exactly similar to those of north Bihar, where the ryot has no other use for his cane than to sell it to the factories. Under these conditions, even when the price of sugar-cane has to be reduced under pressure of competition, the ryot in eastern U. P. and north Bihar is likely to grow cane for the factories until a surprisingly low limit of the sugar-cane prices has been reached. Thus in the immediate post-war period the production in these provinces is not likely to be reduced to any great extent, so long as the exports of sugar from Java to outside countries are not resumed. In the long run the existing pattern of the regional distribution of the industry may be altered and modified considerably; the contribution of

²⁸ Report of the Indian Tariff Board on Sugar (1938), p. 41.

the tropical region to the total production may be increased and that of the U. P. and Bihar reduced substantially. But in spite of these changes, the position of the U. P. and Bihar as the most important producers of sugar in India will remain unaffected.

It will be a great pity, however, if things are allowed to drift to the stage where the ultimate contribution of each region to the all-India total production will be determined after intense competition and struggle. In order to eliminate the possibility of such a violent and wasteful competition in the post-war period, the regional distribution of the production of sugar should be planned in advance at this time on an equitable all-India basis. The nature of sugar industry demands that its regional distribution should be treated on a basis slightly different from that adopted for other industries. The fortunes of millions of rural dwellers are very closely associated with the fortunes of this industry, not only as cultivators of sugar-cane but also as industrial workers in the sugar factories. From this point of view the manufacture of sugar should be treated as a purely rural industry devoted to the processing of agricultural produce. And as such, neither the dependence of certain irrigation projects in peninsular India on sugar-cane cultivation for their financial success nor the dependence of the cultivator in the sub-tropical region on sugar-cane as the principal cash crop be ignored or overlooked in preparing the plans of the future industrial and agricultural development of the country. In order to adjust all these interests and claims judiciously, it will be necessary to decide what part sugar-cane cultivation is to play in the general agricultural economy of different regions; what areas are to be allotted to it and where, in a particular region, these are to be located; what type of rotation is to be allowed and where the produce is to go.²⁹ A long term planning and control on these lines on an all-India basis are essential if the troubles and difficulties through which the U. P. and Bihar industry has passed are to be avoided in future.

²⁹ The newly established Indian Central Sugar-cane Committee has just appointed a 'Planning Sub-Committee' to consider and make recommendations on the part which sugar-cane production should play in the future economy both of the country as a whole and of the various sugar-cane growing provinces and states.

CHAPTER X

THE DISTRIBUTION OF THE LEATHER INDUSTRY

Leather is prepared from the pelts of a number of domestic and wild animals by processing with either the bark or fruits of certain trees and shrubs, or some mineral salts. These vegetable substances and chemicals are called tanning materials. The tanning industry is, thus, dependent upon two things for its development: the pelts of animals and the tanning materials. Of the two raw materials required for this industry the tanning materials are of a 'weight-losing' nature. The tannin obtainable from the various tanstuffs of vegetable origin may amount to anything from 8 or 9 per cent of the total weight of the material to about 40 per cent at the most.¹ Due to this characteristic the tanning materials of vegetable origin exercise greater influence on the tanning industry in drawing it closer to themselves than the pelts. Thus in a number of cases the industry is found localized near the forests or other areas producing tanstuffs.

In Europe the tanning industry was localized in the vicinity of hemlock forests in the northern regions and the oak forests in the southern regions. In the United States of America the bark tanning industry is localized in two belts. One belt reaching the whole length of the Appalachian Mountains, from the New York State to the Georgia State and including Virginia on the east and Tennessee on the west, depends chiefly upon the resources of the chestnut forests, while the other running from Massachusetts to Wisconsin utilizes the materials obtainable from the hemlock forests. A similar development has taken place in India. One bark tanning belt depending mainly on avaram (*Cassia Auriculata*) runs from Madras in the south to Bombay in the west and the other depending upon babul (*Acacia Arabica*) runs from Sind in the west to Cawnpore in the United Provinces in the east.

Nowadays a number of tannin extracts made from the various vegetable tanstuffs are available in the market and make it possible for the tanning industry to be located away from the

1 K. Seshachalam Choudary: (1) *Divi-Divi* (*Caesalpinia Coriaria*) TABLES III and IV, p. 6. (2) *Wattle Bark*, TABLE V, p. 3.

areas producing tanstuffs. But a good tanner always prefers the original materials to the extracts so as to be able to prepare the liquors of the intensity of his own choice and thus to have a greater command over the different qualities of leather made.

When chromium salts and chemicals are used for preparing chrome-tanned leather the emphasis is shifted from the tanstuffs to the highly skilled technical labour and an expert supervising staff. In this branch of tanning industry skilled labour begins to play the most important role and draws the industry to such important industrial centres where the desired type of efficient labour and supervising staff can be obtained easily. Philadelphia in the United States of America has become the greatest chrome-leather manufacturing centre in the world. Calcutta, on account of the presence of chemical and other industries there, is likely to be the most important centre of chrome tanning in India.

India is very rich in tanning materials. But the distribution of these tanstuffs of vegetable origin is very uneven. Southern India as a whole, and the province of Madras in particular, is fortunate in receiving a more generous quota of tanning materials than any other part of the country. The most important tanning materials used in India are avaram (*Cassia Auriculata*), babul (*Acacia Arabica*), myrobalan (*Terminalia Chebula*), wattle (*Acacia Decurrens*) and divi-divi (*Caesalpinia Coriania*). The distribution of these species is as follows:

Avaram is common in the drier parts of the Indian peninsula from Ajmer and the Jumna river southwards, covering large areas in the Deccan. It is common on dry, stony hills in open spaces and in shrub forests and also occurs on black cotton soil and on laterite near the sea-coast.² Avaram bark is collected mainly in the Mysore and Hyderabad States and the Ceded Districts of Madras (Bellary, Anantpur, Kurnool, and Cuddapah).

Babul is probably indigenous to Sind, Rajputana, Gujarat and northern Deccan. It is cultivated or self-grown throughout most of the drier parts of India, but not in the extreme northwest of the Punjab, where the winter cold is too severe. It is also not found in the moister regions.³ The tree is most plentiful in Sind, the United Provinces and the Central Province, where it is grown in plantations. The bark from trees felled for timber or fuel is collected for tanning. A very great drawback of this

² R. S. Troup: *Silviculture of Indian Trees*, p. 373.

³ *Ibid.*, p. 420.

material is that the whole tree has to be felled to get the bark. Such a material cannot become the basis of an expanding industry.

Myrobalan is found throughout the greater part of India in mixed deciduous forests.⁴ The most important areas of production are situated in the forests of Mysore, Hyderabad, Kolhapur and the Deccan states, and of the provinces of Madras, Bombay and the C. P. Bengal and Assam do not produce many myrobalans, nor does the dry north-west of India. The crushed fruit is used in the tanning industry. The best quality fruit in the whole of India is produced in the district of Salem in the presidency of Madras and is wholly absorbed in the presidency in the tanneries at Madras, Bezwada, Katpadi, Trichinopoly, etc.⁵

Before the introduction of European methods of tanning the indigenous tanners in the north and the south used mostly the babul and the avaram barks respectively. The use of myrobalans increased only after the introduction of western methods.

Wattle bark is a material of foreign origin. The use of this substance was not known to the Indian tanners before the World War of 1914 when it was brought to their notice. The heavy demand for bark-tanned leather from India for the supplies of army foot-wear proved the supplies of avaram bark inadequate and drove the conservative south Indian tanner to look for new materials. Among the new materials thus introduced into local tanneries wattle was the most important and being one of the richest tanning materials continued to remain in use.

Another substance of foreign origin is provided by the pods of divi-divi, which was introduced into India in 1834 and which, by the end of the last century, became fully established not only in the districts of North and South Arcot and South Kanara but also in Mysore and Coorg.⁶

The chief reason for the success of tanning industry in Madras and the existence of a large number of tanneries in southern India is the occurrence of *Cassia Auriculata* in abundance in drier districts and the production of the best quality of myrobalans in southern India.⁷ From the point of view of tannin content also, the south Indian tanning materials are of a better

⁴ Troup, *op. cit.*, p. 511.

⁵ K. Seshachalam Choudary and E. Yoganandam Nayudu: *South Indian Myrobalans*, p. 9. •

⁶ K. Seshachalam Choudary: *Divi-Divi*, p. 1.

⁷ M. S. Raghvan: *Note on the Cultivation of Green Wattle, (Acacia Decurrens)* (1939), p. 1.

quality. The following table shows the comparative tannin value of the materials mentioned above:

TABLE XLVIII

The tannin value of some of the important tanning materials

| Material | Percentage of tannin ⁸ | Percentage loss of tannin in the infusion after 60 days ⁹ |
|------------|-----------------------------------|--|
| Divi-Divi | 40 | 29 |
| Myrobalans | 35 | 24 |
| Wattle | 35 | 4 |
| Avaram | 16.6 [*] | ... |
| Babul | 12 to 14 | ... |

* Calculated to a moisture content of 10 per cent¹⁰

It will be seen that in the matter of tannin content the babul of northern India stands at the bottom and taking the tannin content and its loss in the infusion wattle bark appears to be the best. The infusions of tanning materials on keeping undergo many changes and one of these is the loss of tannin. The tannin is, in the course of these changes, converted into substances which are no longer absorbed by the hide. These destructive changes are very low with the wattle. Besides this wattle is a shrub the plantations of which are replaceable easily.

It is on account of these qualities that wattle bark has come to occupy the most important place amongst the tanning materials used in India. The avaram bark is being relegated to an inferior position, not only on account of its high price but also because its supply is neither regular nor sufficient to meet the demand as the bark is obtained from uncultivated wild plants grown in the forest reserves.

The wattle on the other hand is being cultivated in Natal on scientific lines and regular supplies are obtainable from that country, which has become the greatest wattle producing country in the world. Its use is increasing in the tanneries of Madras and Bangalore, and the two most important tanneries of northern India—Messrs Cooper Allen & Co. and the Harness and Saddlery Factory—are using imported wattle bark only. The imports of

⁸ K. Seshachalam Choudary: *Wattle Bark*, p. 3.

⁹ *Ibid.*, p. 3.

¹⁰ *Bark of Hopea Parviflora as a Tanning Material*, (Staff of the Leather Trade Institute, Madras), p. 3.

this bark from South Africa during the three years (1937-38 to 1939-40) were 3,51,809, 3,41,819 and 6,98,231 cwt. respectively.

But even in the use of this bark, south India enjoys an advantage over the north. First, the tanneries of the south are nearer to the sea-ports than the tanneries of the north; secondly, the areas which are suitable for growing wattle are situated in southern India. The plant is found in the Palnis and the Nilgiris, and there is plenty of land available for extension of wattle plantations in these areas as the conditions here are very suitable for its growth.¹¹ In spite of the fact that wattle planting in the Nilgiris is likely to yield a net profit of about Rs. 20 per acre per annum,¹² and is, therefore, a highly remunerative operation, the possibilities of the Nilgiris have not been fully appreciated so far.¹³

Of all the regions of India, the dry north-west and the wet north-east (including Bengal) are the poorest in the supply of local tanning materials. Most of the plants of the Sunder Ban forest division such as goran, sundari, pussur, dhundal, kankra and gurjan, possess a common defect of giving an undesirable red or reddish colour to the leather tanned with them. Sonali is the only plant which gives good results and produces a light coloured leather.¹⁴

After tanstuffs the next important raw material for the leather industry is provided by the animal pelts, which are classified into two broad divisions—the hides and the skins. The pelts of larger animals such as cows, bullocks and buffaloes are called hides, while those of the smaller animals such as the sheep and goats are known as skins. In India the hides of cows, bullocks, bulls, and calves are known by the trade name of 'East

11 M. S. Raghvan: *Note on the Cultivation of the Green Wattle, (Acacia Decurrens)* (1939), p. 7.

12 A. L. Griffith (Siviculturist): *A Note on the Financial Aspect of Wattle Plantation on the Nilgiris*, (1938).

13 The trend of recent discussions in the Central Legislature in connexion with the application of economic sanctions against South Africa as a retaliatory measure against the Pegging Act, showed that our dependence on South Africa in respect of the wattle bark partly stood in our way in taking any such decision. A little determination on the part of the Government to encourage the cultivation of wattle in the Nilgiris can make us independent of the foreign sources of this bark.

14 *Practical Investigations of Some Indian Tanstuffs*, (The Department of Industries, Bengal), pp. 9-17.

India Kips' or simply 'Kips' while the buffalo hides are called 'buff hides' or 'buffs'. India produces enormous quantities of hides and skins and for some time past has been not only the most important exporting country for hides and leather but has constituted the only reservoir for the drawing of the large supplies of light hides by the world markets.¹⁵

The production of hides and skins is not uniform throughout the country as it depends upon the total cattle population in ,

TABLE XLIX

Annual Production of Kips (pieces in lakhs)¹⁶

| Region | Fallen | Slaugh- tered | Total | Percentage of total production |
|-------------------------------|--------|------------------|-------|-----------------------------------|
| Western India | | | | |
| Sind | 1.5 | 0.2 | 1.7 | 0.8 |
| Bombay Province and States | 10.0 | 1.7 | 11.7 | 5.9 |
| Rajputana & C. I. | | | | |
| Rajputana | 6.6 | ... | 6.6 | 3.3 |
| C. India | 2.8 | ... | 2.8 | 1.4 |
| C. P. & Hyderabad | | | | |
| C. P. | 12.2 | 0.7 | 12.9 | 6.4 |
| Eastern States | 4.7 | ... | 4.7 | 2.4 |
| Hyderabad | 11.5 | 1.7 | 13.2 | 6.6 |
| Southern India | | | | |
| Madras Province and States | 30.6 | 10.0 | 40.6 | 20.3 |
| Mysore State | 0.6 | 2.8 | 3.4 | 1.7 |
| Northern India | | | | |
| Kashmir | 1.8 | ... | 1.8 | 0.9 |
| N.-W. F. P. | ... | 2.4 | 2.4 | 1.2 |
| Punjab | 6.8 | 2.6 | 9.4 | 4.7 |
| U. P. | 11.2 | 4.8 | 16.0 | 8.0 |
| Bihar | 12.4 | 4.1 | 16.5 | 8.2 |
| Orissa | 4.0 | 1.3 | 5.3 | 2.7 |
| Bengal | 24.9 | 18.3 | 43.2 | 21.6 |
| Assam | 3.8 | 0.5 | 4.3 | 2.1 |
| Other areas | 2.0 | 1.6 | 3.6 | 1.8 |
| | 147.4 | 52.7 | 200.1 | 100.0 |

¹⁵ Report on the Marketing of Hides in India and Burma (1943), p. 2.

¹⁶ *Ibid.*, p. 7.

different regions and a number of other factors such as the religious sentiments of the people. The distribution of the annual production of hides in different regions of India is given in TABLES XLIX and L.

TABLE L

Annual Production of Buffs (pieces in lakhs)¹⁷

| Region | Fallen | Slaugh- tered | Total | Percentage of total production | Total pieces (Kips Buffs) |
|-------------------------------|--------|------------------|-------|--------------------------------------|------------------------------------|
| Western India | | | | | |
| Sind | 0.4 | ... | 0.4 | 0.7 | 2.1 |
| Bombay Province and States | 3.6 | 0.4 | 4.0 | 7.1 | 15.7 |
| Rajputana & C. I. | | | | | |
| Rajputana | 1.9 | ... | 1.9 | 3.3 | 8.5 |
| C. India | 0.7 | ... | 0.7 | 1.2 | 3.5 |
| C. P. & Hyderabad | | | | | |
| C. P. | 6.2 | 0.2 | 6.4 | 11.3 | 19.3 |
| Eastern States | 3.0 | ... | 3.0 | 5.2 | 7.7 |
| Hyderabad | 2.2 | ... | 2.2 | 3.9 | 15.4 |
| Southern India | | | | | |
| Madras | 11.8 | 3.3 | 15.1 | 26.4 | 55.7 |
| Mysore | 0.2 | 0.6 | 0.8 | 1.4 | 4.2 |
| Northern India | | | | | |
| N.-W. F. P. | ... | 1.8 | 1.8 | 3.1 | 4.2 |
| Punjab | 3.3 | 1.6 | 4.9 | 8.6 | 14.3 |
| U. P. | 3.7 | 1.9 | 5.6 | 9.8 | 21.6 |
| Bihar | 3.2 | 2.0 | 5.2 | 9.1 | 21.7 |
| Orissa | 0.4 | 0.2 | 0.6 | 1.0 | 5.9 |
| Bengal | 1.2 | 0.5 | 1.7 | 3.0 | 44.9 |
| Assam | 0.4 | ... | 0.4 | 0.7 | 4.7 |
| Other areas | 1.6 | 0.8 | 2.4 | 4.2 | 6.0 |
| | 43.8 | 13.3 | 57.1 | 100.0 | |

TABLES XLIX and L show that, taking the buffs and kips together, the province of Madras is leading and is followed by the province of Bengal in the all-India production of raw hides. The U.P. and Bihar rank next; the western areas stand much lower in the list, although the Punjab, Rajputana, the Western U. P., C. I., Gujarat, and Kathiawar form the main cattle belt

¹⁷ Report on the Marketing of Hides in India and Burma (1943), p. 9

of India. The reason for this apparently anomalous position is to be found in the fact that in northern and western parts of India the climatic and pasture conditions are favourable and the cattle are generally superior and well cared for by the numerous professional breeders found in these parts. In most of the Hindu states, the slaughter of cattle is discouraged if not actually prohibited. On account of these factors the rates of mortality and slaughter are lower and the percentage of hides to the cattle population ranges between 4 and 9. In Madras and Bengal, on the other hand, the cattle are weak and degenerate and die in large numbers. The corresponding rates of mortality and slaughter for these areas are consequently higher and the percentage of hides to the cattle population ranges between 13 and 28.

The regional distribution of the production of skins is given in TABLE LI opposite.

It will be seen that in the production of skins the province of Madras stands second to the United Provinces but in the production of sheep skins alone it occupies the first place, as it produces nearly a quarter of the sheep skins produced in the whole of India, and taking the hides and skins together the province of Madras produces the largest number of pieces in the whole country.

From the point of view of labour, the province of Madras and the states of Mysore and Hyderabad are again at an advantage. These areas have considerable population of the castes who undertake the work of tanning the hides and skins and have been doing the work for generations. In the Mysore State, this work is mostly done by a class of people known as Adikarnataks. In the U. P. and other parts of northern India, the work of tanning is undertaken by Chamars.

With regard to the markets for finished leather, there is very good demand in the northern and western regions for the manufacture of foot-wear. The two biggest factories of India engaged in making boots and shoes are situated in the U. P. (Cooper Allen & Co., at Cawnpore) and in Bengal (The Bata Company at Batanagar near Calcutta). The Government Harness and Saddlery Factory, the only one of its kind in India, is also located at Cawnpore. Besides this considerable quantities of leather are required by smaller shoe-making concerns at Agra, Lucknow, Calcutta and most of the other important towns of northern India. The industrial demand for roller skins, picker bands and

leather belting is also important in the northern, western and central parts of the country.

Such a demand for finished leather is not in evidence in southern India. On account of climatic reasons the people of the south are habituated to live bare-footed and there is little local demand for foot-wear. But there has always been a considerable demand for half finished leather for export to foreign countries from the port of Madras.

TABLE LI

Annual Production of Skins (pieces in lakhs)¹⁸

| Region | Production of goat skins | Percentage of total production | Production of sheep skins | Percentage of total production | Total No. of pieces of both kinds |
|--------------------------|--------------------------|--------------------------------|---------------------------|--------------------------------|-----------------------------------|
| Western India— | | | | | |
| Sind | 6.3 | 2.3 | 1.7 | 1.1 | 8.2 |
| Bombay Province & States | 26.2 | 9.5 | 11.8 | 23.5 | 49.7 |
| Rajputana & C. I.— | | | | | |
| Rajputana | 21.3 | 7.8 | 13.7 | 8.0 | 35.0 |
| C. I. | 4.7 | 1.7 | 0.6 | 0.4 | 5.3 |
| C.P. & Hyderabad— | | | | | |
| C. P. | 11.3 | 4.1 | 2.3 | 1.3 | 13.6 |
| States | 7.1 | 2.6 | 1.8 | 1.1 | 8.9 |
| Hyderabad | 16.3 | 5.9 | 12.6 | 10.0 | 33.4 |
| Southern India— | | | | | |
| Madras | 20.5 | 7.4 | 41.2 | 24.2 | 61.7 |
| Mysore | 3.3 | 1.2 | 5.7 | 3.3 | 9.0 |
| Northern India— | | | | | |
| Kashmir | 3.1 | 1.1 | 4.6 | 2.7 | 7.7 |
| N.-W. F. P. | 5.7 | 2.1 | 5.3 | 3.1 | 11.0 |
| Punjab | 18.7 | 6.8 | 15.1 | 8.8 | 33.8 |
| U. P. | 53.2 | 19.4 | 17.0 | 10.0 | 70.2 |
| Bihar | 28.8 | 10.5 | 3.0 | 1.8 | 31.8 |
| Orissa | 3.3 | 1.2 | 0.8 | 0.5 | 4.1 |
| Bengal | 29.6 | 10.8 | 3.5 | 2.0 | 33.1 |
| Assam | 1.5 | 0.5 | 52.4 | ... | 28.9 |
| Other areas | 14.0 | 5.1 | 13.7 | 8.0 | 22.0 |
| | 274.9 | 100.0 | 170.6 | 100.0 | |

¹⁸ Report on the Marketing of Skins in India and Burma (1943), pp. 5 & 7.

Thus considering the resources of different regions in tanning materials, hides and skins, and labour, southern India (especially the province of Madras and the Mysore State) occupies a unique position in the whole of India for the tanning of leather. Then again, this region had the advantage of an early start. The province of Madras was the first in India to adopt improved methods of tanning. As early as the forties of the last century, a French European of Pondicherry is said to have visited the island of Mauritius and acquired a practical knowledge of the French process of tanning and on his return to India he set up several small tanneries in the neighbourhood of the city of Madras. Of his improvements the most important was the immersion of the tanned skins in a bath of myrobalans after the ordinary tanning had been completed. This prevented a very objectionable change in colour of the leather, tanned with avaram bark only, on exposure to sunlight. The province of Madras and the Mysore State thus succeeded in developing a leather industry based partly on their own raw materials and partly on materials obtained from other provinces. Since the war of 1914-18 they also began to import wattle bark from Natal to supplement their local supplies.

The development of leather tanning in northern India in contradistinction to the light tannages of southern and western India is entirely the outcome of military efforts to obtain suitable supplies of army boots and accoutrements. At Cawnpore, soon after the establishment of the Harness and Saddlery Factory on a permanent basis in 1867, Messrs Cooper Allen & Co. started the Government Boot and Army Equipment Factory and, at the outset, received a considerable amount of financial assistance from the Government. The successful establishment of the industry on a large scale is due to the following facts: (1) Cawnpore is a convenient centre for the collection of hides from northern India; (2) at the outset there were large supplies of cheap babul bark, an excellent tanning material; (3) the business was in the hands of enterprising Europeans, whose efforts were viewed with favour, and largely assisted by the Government, which provided a market in the early days for the bulk of the outturn; (4) the Chamars of the surrounding region, who were originally village labourers and tanners, were available for work in the tanneries.

Later on the resources of the United Provinces and the neighbouring regions in tanning materials and hides and skins

together with the extensive military and civilian demand for leather goods helped the industry to develop to its present dimensions. The supplies of tanstuffs are now being supplemented by imports of wattle bark from Africa. Chrome tanning also is being adopted partly. From the point of view of preparing bark-tanned finished leather, the region from Cawnpore to Agra has become the most important area in the whole of India.

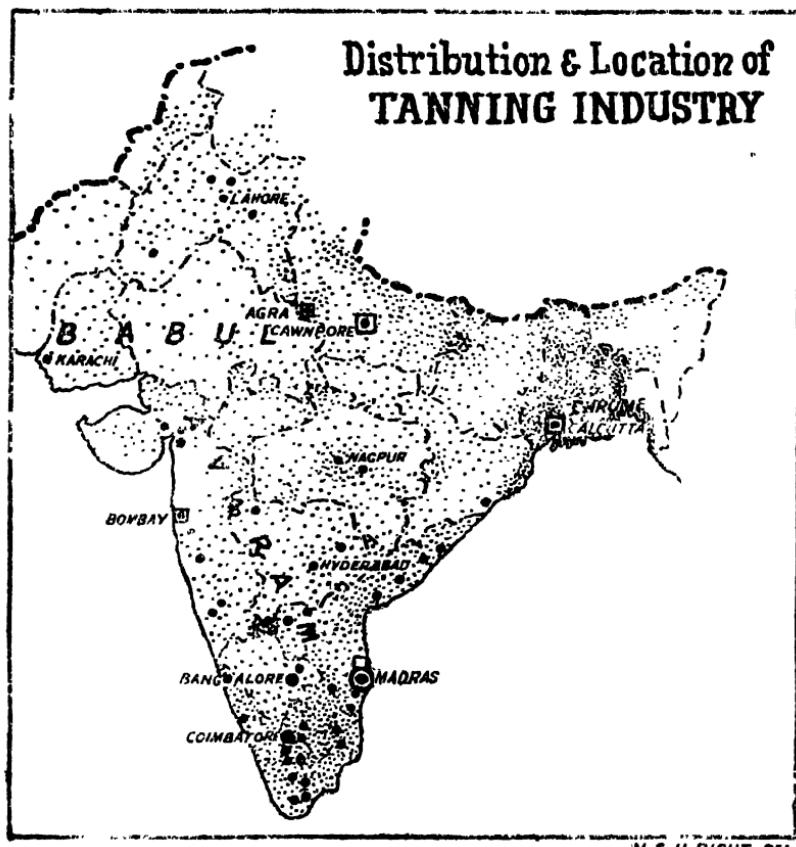
The local resources of the province of Bengal in hides and skins are as already stated second only to those of Madras but good local tanning materials are not available. Bark and myrobalans have to be obtained from other parts of India. The port of Calcutta is the principal outlet for raw hides¹⁹ exported out of India and provides an important market for finished leather. These factors also place the tanning industry of this region in a favourable position. In consequence, the tanning industry of a considerable size has been built up; but on account of the lack of local tanstuffs and the presence of an important section of chemical industry chrome tanning is becoming more important. A unique feature of the Calcutta industry is that a considerable quantity of an inferior type of chrome-tanned leather is turned out by the Chinese tanners on a cottage industry basis.

Chrome tanning is a difficult process as very great skill and care are necessary in adjusting the doses of chemicals to the requirements of leather so that the finished product may not be damaged. Besides this superior hides and skins are required for this process because they do not gain at all in weight and pulp in the process of tanning as actually happens in the process of bark tanning. The greatest advantage of the chrome process, however, is that it takes less than a month for changing the hides into finished leather as against the period of six months taken up by the bark tanning process. Yet there is no doubt that the bark-tanned leather is superior to chrome-tanned leather in certain respects.

The regional distribution of the tanning industry on the basis of average daily employment is as in TABLE LII (p. 175).

¹⁹ The Calcutta tanneries are not able to take full advantage of this factor. Due to export specialization bigger lots of hides are available. Shippers buy assorted lots and then re-classify them in their own selections. The tanners require different classes of hides in smaller lots, in which the wholesale merchants do not appear to be interested. (Minutes of evidence recorded by the Indian Fiscal Commission, 1923, Vol. II, p. 449).

Distribution & Location of TANNING INDUSTRY



N. S. H. BISHT DEL

PRODUCTION OF KIPS - - - - -

IMPORTANT CENTRES

OTHER CENTRES

MARKET FOR FINISHED LEATHER

PORT OF EXPORT FOB HALF TANNED LEATHER

TABLE LII

The regional distribution of the tanning industry

| Region | No. of workers (1937) | Percentage of total employment in tanning industry |
|-----------------------|--------------------------|--|
| Western India | | |
| Bombay Province | 295 | |
| Bombay States | 200 | 6.9 |
| Rajputana | 72 | 1.0 |
| Hyderabad | 625 | 8.6 |
| Southern India | | |
| Madras | 2,699 | 37.0 |
| Mysore | 1,234 | 16.9 |
| | | 53.9 |
| Northern India | | |
| Kashmir | 43 | 0.6 |
| Punjab | 109 | 1.5 |
| U. P. | 1,390 | 19.0 |
| Bengal | 618 | 8.5 |
| | | 29.6 |

The table given above shows that the province of Madras along with the Mysore State employs 53.9 per cent of the total labour employed in the whole of India in the tanning industry; the shares of avaram belt (including Bombay, Hyderabad, Mysore and Madras) and the babul belt (including Rajputana, the Punjab and the U. P.) in the total employment are 69.4 and 21.5 per cent respectively.

The regional distribution on the basis of the output of tanned leather is given in TABLE LIII overleaf.

It will be seen from the table given overleaf that the province of Madras along with the Mysore State produces 90.6 and 77 per cent of the half-tanned hides and skins respectively, the avaram belt (including the provinces of Madras and Bombay and the states of Hyderabad and Mysore) accounts for the production of nearly 100 per cent half-tanned hides and 97.3 per cent half-tanned skins. In case of finished leather 40.2 per cent of the total number of hides are tanned in the United Provinces and 21.8 per cent in Bengal. Madras, Bombay and Mysore account for 29.4, 4.2 and 1.9 per cent respectively. Nearly two-thirds of the finished pieces of skins are again tanned in the

TABLE LIII

Annual production of tanned leather (pieces in lakhs)

| Region | Tanned Hides ²⁰ | | | | Tanned Skins ²¹ | | | | Process |
|--|----------------------------|----------|---------------|---------------------|----------------------------|----------|---------------|---------------------|---------|
| | Half-Tanned | Finished | No. of pieces | Percentage of total | Half-Tanned | Finished | No. of pieces | Percentage of total | |
| Western India Sind and Baluchistan | 0.3 | .... | .... | .... | 2.68 | 1.4 | .... | .... |  |
| Bombay Province and State | 2.0 | 2.4 | 1.3 | 4.2 | 9.61 | 5.0 | .... | .... | (a) |
| C. P. and Hyderabad C. P. | .... | .... | .... | .... | 0.21 | 0.1 | .... | .... |  |
| Hyderabad | 6.0 | 7.0 | .... | .... | 29.12 | 15.3 | .... | .... | (b) |
| Southern India Madras | 71.0 | 82.6 | 9.0 | 29.4 | 142.00 | 74.4 | 14.60 | 61.5 | (c) |
| Mysore | 6.8 | 8.0 | 0.6 | 1.9 | 5.00 | 2.6 | .... | .... | (b) |
| Northern India Punjab | .... | .... | 0.8 | 2.5 | .... | .... | 2.40 | 10.6 | |
| U. P. | .... | .... | 12.3 | 40.2 | .... | .... | 3.69 | 16.3 | (b) |
| Bengal | .... | .... | 6.6 | 21.8 | 1.50 | 0.5 | 1.84 | 8.1 | (d) |
| Other areas | .... | .... | .... | .... | 0.70 | 0.4 | 0.10 | 0.5 | |
| | 86.1 | 100.0 | 30.6 | 100.0 | 190.82 | 100.0 | 22.63 | 100.0 | |

(a) Mainly Bark, (b) Bark and Chrome, (c) Hides—Bark and Chrome, Skins—wholly Bark, (d) Mainly Chrome.

²⁰ Report on the Marketing of Hides in India and Burma, p. 96.

²¹ Report on the Marketing of Skins in India and Burma, p. 47.

province of Madras, while the U. P., the Punjab and Bengal account for 16.3, 10.6 and 8.1 per cent respectively.

The table also discloses two-fold specialization trends. First, on account of the considerations of demand discussed earlier in this chapter, the southern and western regions (from Madras to Bombay) specialize in the production of half-tanned leather for export overseas, while Northern India specializes in the tanning of finished leather mainly for consumption in the country itself. In the north, the major part of the productive capacity of the industry is confined to the United Provinces (mainly Cawnpore and Agra) and Bengal (mainly in and around Calcutta). Secondly, on account of the richness of the southern and western regions in the supply of tanstuffs, the bark tanning process is most important there, while in Bengal the scarcity of the tanning materials and the existence of chemical industry tend to encourage the development of chrome tanning in preference to bark tanning. In the United Provinces both the processes—bark and chrome—are being followed, although the bark tanning process is more prevalent.²²

The leather industry has made notable progress during war time. The production of all tanneries capable of turning out leather to Government standards has been fully organized to meet the war demand. Pre-war tanneries have increased their production, while additional tanneries, some 30 to 40 in number, have also come into being. The new concerns are relatively small units, but they have helped substantially to increase the production of the organized tanning industry by more than 300 per cent over the pre-war level. The productive capacity of the Cooper Allen Company at Cawnpore has been stepped up from 2,000 pairs daily to 9,000 pairs. The output of the Bata Shoe Company has also doubled. Besides these an improved method of vegetable tanning which reduced the time taken by the tanning process from six months in the pre-war days to three or four months at present has developed, and a subsidiary industry capable of producing heels, toe-tips, eyelets, nails, thread, etc. for about 300 lakh pairs has come into existence in northern India.

All these gains may not be retained in the post-war period, but we can certainly utilize a vast army of highly skilled workers

22 The tanneries adopting chrome process, although large individually and tanning nearly 21 lakh finished hides (mostly kips and calves), are not more than a dozen in the whole of India.

that has been built up for substituting finished leather in place of raw and half-tanned hides and skins in our export trade. The foreign countries may endeavour to secure the Indian raw material and may refuse Indian manufactured leather. But, if Indian tanners are able to produce finished goods of anything like the quality that can be manufactured from our raw material in Europe and America, 'the contribution to the world's markets which India is able to make is of sufficient importance to enable her to dictate in what form it should leave the country.'²³

Besides the scope for exports of finished leather overseas, there is considerable room for further expansion of the foot-wear industry of India. The annual consumption of pairs of shoes per head in western countries ranges from 1.95 in France to 3.37 in the United States of America. The corresponding figure for India is 0.09. This means that hardly every tenth person can get a pair of shoes yearly while the remaining nine must go bare-footed. If the standard of living rises even slightly in this country, the demand for shoes is also likely to increase considerably and, therefore, the consumption of finished leather in the foot-wear industry will also increase proportionately. If the post-war opportunities are utilized properly an extension of the tanning industry is likely to take place in most of the regions. A considerable change from half-tanned to finished leather can also be expected, and the day when the leather industry should come to occupy a place in our national economy alongside of the textile and sugar industries may not be far off.

²³ Report of the Indian Industrial Commission (1916-18), p. 359. (These words are as true today as they were a quarter of a century back. Just before the beginning of the Second World War India topped the list of the eight principal countries of the world in the exports of hides and leather.)

CHAPTER XI

INFLUENCE OF COMMUNICATIONS ON THE PRESENT LOCALIZATION OF INDUSTRIES

A careful study of the growth and development of modern large-scale factory industries would show that although they were an outcome of a number of inventions relating to the use of power and certain mechanical appliances and machines, their rapid growth and marvellous development were greatly assisted by the improvements in land and water communications. Without the modern means of transport and communications the assembling of the huge quantities of raw materials from the four corners of the earth required by the present-day large-scale industries and the distribution throughout the world of the vast stocks of finished goods produced by them would have been impossible. Therefore, in the choice of sites for the location of these industries the transport relations have always played an important part.

Water transport, especially by sea, has always been cheaper over long distances and, therefore, places on the sea-coast with harbour facilities have enjoyed favourable transport conditions. Great ports, where ocean transport lines converge and are linked up with a network of converging land transport lines (generally railways and sometimes a navigable river) acquire special importance on account of the fact that a change from one form of transport to another involves heavy terminal charges. These breaks in the transport network and the consequent imposition of terminal and transhipment charges give rise to a tendency to evade such costs by locating factories using the imported materials in the ports themselves. Such industries in important port towns furnish examples of 'break-localization' and most of the important ports of the world are great manufacturing centres also in spite of the fact that in some cases practically all the raw materials used by them have to be transported from long distances.

In the case of land transport, however, a centre of converging railways does not constitute a break in the system, unless there are differences in the gauges used by different lines, because the wagons can be switched from one line to another without any difficulty. Such railway junctions, therefore, offer

less attraction to industry than do the ports. Such a centre is in a better position, however, for the collection of raw materials and for the distribution of manufactured commodities than towns or cities situated nearer the circumference and it naturally becomes a favourable site for the location of a number of large-scale industries. In the case of new countries like Canada or industrially young countries like India the industries have followed the railways from the ports into the interior. Besides these general considerations, the freight policies pursued by shipping lines and railways profoundly influence the distribution and location of industries.

In England and other Western countries, the development of large-scale industries was preceded by the construction of good roads and railways but when India began her industrialization in the middle of the nineteenth century there were no good roads, and the Great Indian Peninsula and the East India Railways—the earliest to be constructed—were in their embryonic stage. At this time the Ganges and the Indus river systems provided the main highways of commerce in Northern India. The traffic from such distant places as Amraoti and Nagpur in peninsular India also moved to the banks of the Ganges to find an outlet through the ports of Bengal. 'The cotton of Nagpur and Amraoti was brought for sale to Mirzapore, a distance of 500 miles by oxen carrying 160 lbs. each, travelling on an average seven miles a day. The cost of carrying one ton in this manner was about £ 17-10s. and if it rained in the journey the carrier often perished under the burden of saturated cotton in the soft and unmetalled track.'¹ Similarly the goods traffic towards the western ports of Surat and Bombay from the Indo-Gangetic plains (via Agra, Ajmer and Ahmedabad), central India (via Burhanpur), and the Deccan was carried by caravans of oxen or wagons drawn by oxen. These caravans consisted of 10,000 to 12,000 oxen or of 100 to 200 wagons² and their speed was necessarily very slow. Even after the establishment of British dominion in India it was not till 1836 that a road was commenced running from Calcutta to Delhi which was afterwards extended to Peshawar.³

¹ J. Bourne: *Railways in India* (1848), quoted by N. Sanyal in his book, *The Development of Indian Railways* (1930), p. 2.

² Tavernier: *Travels in India* (Second Edition, 1925), Vol. I, pp. 30-35.

³ W. P. Andrew: *Indian Railways* (Fourth Edition, 1884), p. XI (Preface).

The above description gives a fair idea of the condition of the means of communications in the interior of India up to the middle of the nineteenth century. These communications were hardly conducive to the establishment in the interior of large-scale factory industries, which not only required raw materials to be collected from and finished goods to be distributed over vast areas but also had to depend upon imported plant and machinery to start with and coal to provide power for the machinery.

But in the matter of sea communications the country was in a much better position. All her vast coastline was dotted over with ports engaged in trade and commerce with Eastern and Western countries. Two of the newly developed ports—Bombay in the west and Calcutta in the east—had begun to play an important part in the trade and commerce of the world. Later on, owing to their geographical position in relation to the cotton and jute producing regions of India, one of them—Bombay—came to be identified with the export of cotton and the other—Calcutta—with that of jute. As harbours important in the world trade these ports attracted Indian and foreign finance, entrepreneurial ability and technical assistance. Hence the first cotton mill was established at Bombay in 1851 and the first jute mill in the Hooghly riverain in 1855, and the two most important industries of India continued under favourable transport conditions to concentrate and expand in these two centres in the second half of the nineteenth century.

But in the absence of railways it was practically impossible to start a mill in any town in the interior. The method adopted by the Indore Government for bringing the machinery to Indore in 1866 to start a cotton mill may be taken as an illustration of the transport difficulties then encountered by inland centres. At this time railway service was available from Bombay only up to Bhusawal and Indore had no railway connexion. The machinery of the cotton mill had, therefore, to be hauled from Bhusawal to Indore by elephants.⁴

The construction of the East India and the G. I. P. Railways was sanctioned in 1849 and of the Madras and the B. B. & C. I. Railways in 1852 and 1855 respectively. These railways began to penetrate inland from the port towns of Calcutta, Bombay and Madras but as the Mutiny broke out in 1857 much progress

⁴ *Indian Textile Journal*, March 1942, p. 165.

could not be made till 1863. The important sections of these railways open for public traffic in 1863 were:

East India (1) Howrah to Chunar, (2) Burdwan to Raniganj, (3) Allahabad to Hathras.

G. I. P. (1) Bombay to Bhusawal, (2) Bhusawal to Malkapur on the Nagpur branch, (3) Bombay to Sholapur.

B. B. & C. I. (1) Daman Road (125 miles north of Bombay) to Ahmedabad.

Madras (1) Madras to Beypore.

Besides these a number of other lines were under construction in the provinces of Bengal, Madras, the Punjab and Bombay (Sind). By the year 1866, Howrah and Delhi, and Bombay and Ahmedabad were linked up and by 1873 the G. I. P. railway from Bhusawal reached Nagpur. But the completion of the main structure of the Indian railways connecting Calcutta and Delhi (1866), Calcutta and Bombay (1870, via Jubbulpore), Bombay and Madras (1873, via Raichur), Delhi and Sukkur (1878, via Amritsar, Lahore and Multan), and Madras and Calcutta (1899) took nearly fifty years (1849-99).

The opening up of the interior regions of India by the railways placed the modern transport facilities within the reach of most of the important towns situated in the interior of the country and the development of trade, commerce and financial facilities, following the introduction of the modern means of communication, led to the establishment of the pioneer units of modern textile, leather and sugar industries in a number of towns in the different regions. Cotton mills sprang up at Ahmedabad (1859), Sholapur, Cawnpore (Elgin, 1864), Madras (Buckingham, 1876), and Nagpur (Empress, 1877); woollen mills were started at Cawnpore (Lal Iml, 1876) and Dharival; tanneries and leather works at Cawnpore (Harness and Saddlery Factory, 1867⁵ and Boot and Army Equipment Factory, 1880), and at Madras; and sugar mills in North Bihar⁶ (1899). During the last eighty or ninety years the network of internal means of communication, provided by railways and roads, has been improving progressively and as a result of improvements in

⁵ It existed on an experimental scale since 1860.

⁶ The first attempts at starting the sugar mills in North Bihar were made by the Dutch as early as 1841-42. One of their plants was located at Barrah.

transport facilities the textile, leather, sugar and other consumption goods industries have become established very widely in the major provinces of Bombay, Madras, the C. P., Bengal, the U. P., and the Punjab and in the Indian States of Baroda, Central India, Mysore and Hyderabad.

The modern means of communication throughout India have played an important part in influencing the location of the different units of the various industries, but their effect has in no other case been so decisive as in the case of the jute industry. The most important jute growing region of the province of Bengal lies to the east of the water-way represented by the Brahmaputra-Jumna-Padma system. This water-way is unbridged throughout and divides the land communications of the province—the railways and the roads—into eastern and western parts. This break in the land communications creates the unavoidable problem of transhipment at a number of points (discussed earlier in this book) in the course of the traffic between eastern and western parts and, therefore, no jute mills have been established to the east of this line. Then again most of the streams to the south of the Ganges, to the east of the Bhagirathi-Hooghly and to the west of the Meghna are mere spill channels dry during the winter months and subject to all the complications of tidal channels towards the sea ends. Owing to these difficulties there is only one port—Calcutta—in the whole of the region, lying on the river Hooghly. Even this port has to be kept clean by dredging. In these circumstances, an export industry like the manufacture of jute has no other alternative but to concentrate itself in the Hooghly riverain on both sides of Calcutta.

Although the construction of railways has been one of the major factors responsible for the establishment of the industrial units in the towns of the interior of India, their early development and freight policies favoured unduly the port towns and the foreign trade as against the interests of the inland towns and a uniform general industrial development of the country. The railways as they penetrated inland from the ports of Bombay and Calcutta, further strengthened the agglomerating tendencies, already at work in these centres, by linking up modern land communications of the country with the sea communications at these ports. As this period of railway development coincided with the gap between the decay of handicrafts and the establishment of modern industries, in the industrial

history of India, the Indian railways, because they were owned and managed by foreigners, from their very inception developed a freight policy of encouraging the flow of raw materials to the main ports for being exported abroad and the transport of imported manufactures to inland centres connected with their systems. When the different railway systems, which were owned by different railway companies in different regions, approached each other in the interior in their later stage of development, each railway embarked on a competitive policy with a reduction of freight rates, to secure as much of the traffic to itself as possible from the interior. These rates, inasmuch as the internal traffic was concerned, were inequitable, unfair and unjust and were prejudicial to the interests and growth of indigenous industries. To take an example from the cotton trade, the rates charged from cotton growing tracts to some of the western ports were lower for longer distances than for shorter distances to inland industrial centres. The railway risk rates for 'full pressed' cotton charged by the N. W. Ry. (prior to 1918) from certain stations in the Punjab to Karachi and to Delhi given below illustrate this discrimination in rates.

TABLE LIV

| Distance to Karachi | Special rates to Karachi | Cotton at spatching station | Distances to Delhi | Class rates to Delhi |
|------------------------|-----------------------------|--------------------------------|-----------------------|-------------------------|
| 576 | 1-0-9 | Multan | 454 | 1-3-2 |
| 684 | 1-3-9 | Lyallpur | 387 | 1-0-5 |
| 673 | 1-3-5 | Abbaspur | 396 | 1-0-9 |
| 625 | 1-2-1 | Chutiana | 444 | 1-2-9 |
| 607 | 1-1-7 | Darkhana | 454 | 1-3-2 |

The rates from Multan, Chutiana and Darkhana are lower for longer distances to Karachi than those for shorter distances to Delhi.

Another example, where the freight policy was prejudicial to the progress of the indigenous industries in the interior, is furnished by the discriminating rates charged by the railways on indigenous and imported sugar. Special rates were quoted for imported sugar from the ports, irrespective of weight and at railway risk. Distance for distance these rates were, in many

cases, lower than the rates even for wagon loads of indigenous sugar carried at owner's risk.⁸

The freight on imported sugar was reduced twice (in 1904 and 1905) and increased imports of sugar coincided with the reduction of rates. These low rates were very harmful to the growth of the sugar industry in the interior of the country and unnecessary even from the commercial point of view of the railways themselves, as the Java sugar never needed these concessions for the development of traffic. While tendering his evidence before the Indian Fiscal Commission (1923) Mr S. C. Ghosh said: 'Java sugar is produced very cheap....the cost of producing superior white sugar, including all expenses, was said to be Rs. 4-9-2 per maund; and even taking interest on capital would come to Rs. 5 or 5-8. It compared very favourably with the minimum price of Java sugar in Calcutta which was Rs. 11-4 per maund before the war. So that Java made handsome profits out of sugar exported to India. The steamer freight was then but a fraction of the latter figure (viz. Rs 11-4), the price of sugar in Calcutta. It is questionable, therefore, whether the traffic needed further subsidy in the way of cheap railway rates that were quoted from the ports to the interior. Even if the rates for Java sugar were full maximum rates the railways would not have lost the traffic but the profit of the Java producers would have been less.'⁹

The rates on hides from the internal centres to the ports of Karachi, Bombay and Calcutta were one-tenth of a pie per maund per mile, i. e. the minimum permitted by the Government. But, from Delhi to Cawnpore they worked out at 0-25 pies per maund per mile. The following observations made by the Indian Industrial Commission show clearly how these rates operated to the detriment of the Indian industries: 'As an example of undue reduction of rates on exports, we would quote the case of hides. Their production cannot be affected by railway rates, though their disposal may be; and the grant of port rates nearly 50 per cent less than the internal rates has certainly discouraged Indian tanning, and aided certain foreign industrialists to obtain a hold on a class of raw material of which India possesses a partial monopoly.'¹⁰

8 Ghosh, *op. cit.*, p. 230.

9 Minutes of Evidence recorded by the Indian Fiscal Commission (1923), Vol. II, p. 528.

10 Report of the Indian Industrial Commission (1916-18), p. 172.

As regards wool, the through rates from Kashmir to the ports were easier than the rates from Kashmir to the manufacturing centres in India. Mr V. N. Mehta, Director of Industries, U. P., while giving his evidence before the Indian Fiscal Commission, was definitely of the opinion that the railway policy had directly encouraged the export of raw materials to European countries as against the establishment of local manufacturing industries.¹¹ Complaints about the preferential treatment of import and export traffic and the discontinuous mileage rate system were also made by a number of witnesses before the Indian Tariff Board on Cotton Textile Industry (1927),¹² and the Indian Railway Enquiry Committee (1937).¹³ Broadly speaking, the Indian railways followed a policy of quoting specially favourable rates for raw produce moving to the ports and for imported manufactured goods moving from the ports to the interior; and in consequence many inequalities arose between goods for export and imported articles on the one hand, and the goods for internal use and the locally manufactured articles on the other. These inequalities in their turn were largely responsible for the congestion of the industries in the port towns.

So far only the freight policy discriminating between port towns and the regions of the interior has been discussed. There were yet other types of rates and charges which meant discrimination even between the different regions of the interior. Out of the rates and charges of this nature the 'block rates' and the 'discontinuous mileage rates' were very harmful from the point of view of an even distribution of the industries in the regions of the interior. Criticizing this attitude of the Indian railways the Indian Industrial Commission wrote: 'Another instance of this attitude lies in the "block rates", or higher mileage charges for short lengths imposed on traffic moving from a station near a junction with another system towards the junction, in order to travel a much longer distance over that other system. Similarly when "scale" or "tapering" rates are charged, which involve a reduction of mileage rate increasing with the length of the lead, each railway treats the length on its own system as the sole basis

11 Minutes of Evidence recorded by the Indian Fiscal Commission (1923), Vol. I, p. 260.

12 Report of the Indian Tariff Board on Cotton Textile Industry (1927), Vol. IV, p. 559.

13 Report of the Indian Railway Enquiry Committee (1937), pp. 80-83.

for its charges, irrespective of the total lead, and a consignment which divides a journey of 300 miles equally between three railways only obtains the mileage rate applicable to a lead of 100 miles. "Terminal" charges are sometimes also used for a similar object, viz. to extract as much as possible from traffic which will presumably travel a greater distance over a foreign line than over the line of its origin. There may be justification for these expedients in many cases, but it would appear that they often affect traffic undesirably. They have accentuated inequalities and have, on the whole, tended to operate to the disadvantage of internal traffic and, therefore, of Indian industries.

'An incidental effect of the policy that has stimulated traffic to and from the ports has been the congestion of industries in the port towns. The same advantage of favourable rates, granted to a less degree at other important traffic centres, has had similar though less marked results in their case also.'¹⁴

Next to freight policies and the rates the facilities of transport made available by the Indian railways to the internal and to the export and import traffic deserve consideration. As one of the main objects of the construction of the major railway systems in India was the development of exports of raw materials and the imports of manufactured goods, the facilities of transport provided by these railways continued for long to be overwhelmingly in favour of such traffic and inimical to the interests of the indigenous industries of the country in general, and of those in the interior regions in particular. As an example of the lack of facilities of transport a case of the cotton industry at Nagpur may be cited. As it turned out, a considerable quantity of the Punjab-American cotton ordered by the Manager of the Empress Mills at Nagpur in December, 1917, at the instance of C. A. H. Townsend Esqr., I. C. S., Director of Agriculture, Punjab, had not reached Nagpur till July, 1918. It also appeared that during the long period of delay by the railways coverings of the consignment had been damaged almost beyond recognition. In the light of such an experience it was not surprising for Mr Townsend to be led to think that it was far easier to carry the cotton to Karachi than to Nagpur. The cotton purchased by the proprietors or lessees of cotton ginning factories on the Lahore-Karachi line, some 100 miles by rail, had also met with the same fate. One of them had bought about 40 wagon loads.

But when the Director of Agriculture, Punjab, visited the locality later on he found the cotton still lying in the goods sheds of the railway stations.¹⁵

The difficulties experienced by the iron and steel industry at Jamshedpur may be taken as an example of the failure of the transport facilities provided by railways to keep pace with the development of the industries in the interior of the country. The Report of the Tata Company for the year ending 31st March, 1921, while reviewing the position of the industry in 1921, stated: 'We are now, however, faced with the very serious position regarding the railway transport. We have repeatedly pressed this upon the attention of the railways and Government, and although the Bengal-Nagpur Railway has made certain additions to its equipment the additions are not adequate to handle the traffic which we shall require when the extensions are in full operation. The directors have considered and are considering the effect of this restricted development upon the progress of the greater extensions, and will retard these if it appears that the railway will not be able to handle raw materials and finished products as it would be no advantage to the steel company to erect plant that would stand idle for want of railway facilities.'

Specific complaints about the lack of facilities such as yards, sidings and extra tracks were also made by Messrs Martin & Co. before the Committee on the Working of the Indian Railways¹⁶ and the shortage of wagons, the inconvenient routing of traffic, unnecessary breaks of gauge, losses from careless handling or from dishonesty of the railway servants, the questions of the risk notes and the like were frequently mentioned before the Industrial Commission by a number of witnesses¹⁷

Thus we are led to conclude that, at the starting of modern large-scale industries in India, it was the lack of railways and good metalled roads in the country that brought about the establishment of pioneer mills in the port towns; later on it was the earlier policy of the Indian railways, favouring unduly the port towns in the matter of freight rates and transport facilities

¹⁵ Report of the Committee on the Working of Indian Railways (1920-21), Vol. III, p. 259, para. 5961 and Vol. IV, pp. 228-30.

¹⁶ Report of the Committee on the Working of Indian Railways (1920-21), Vol. IV, p. 98.

¹⁷ Report of the Indian Industrial Commission (1916-18), p. 173.

that led eventually to a congestion of industries in these port towns at the expense of regions in the interior. Again in the interior regions, the railways, following similar policies, helped the concentration of industries in a comparatively small number of towns and cities, e. g. Cawnpore and Nagpur, which happened to be important inland transport centres.

Since the establishment of Railway Rates Advisory Committee however, the preferential rates, favouring ports or certain other centres, are giving way to more uniform rates based on distances. The amalgamation of the Madras & Southern Maratha and the South Indian Railway and a regrouping of the Indian State Railways is under contemplation. As most of the important lines are now owned by the State, the abolition of discontinuous mileage rates and unnecessary competition between individual lines is over-due as an integral part of the proposed scheme of regrouping. The establishment of fair and equitable rates for all centres and regions alike will greatly assist the dispersion of industries from the regions of heavy concentration towards the regions which are comparatively less developed or undeveloped.

Some of the new industries like aircraft and ship-building have already made a small beginning and others like those of the manufacture of machinery (for sugar, textile and electrical industries), electric motors and automobiles are likely to be started soon. The success of all these industries will depend upon the supplies of cheap steel and steel alloys—their chief raw materials. The State railways can, as suggested by the Engineering Association of India, help the production of cheap steel by introducing special concession rates for full train loads of iron ore, coal and lime from the mines and quarries of the iron and steel companies to their iron and steel works. Such a special rate for full train loads will be perfectly justified on account of economies involved in moving full train loads between two points only, as compared with the traffic in wagon loads intended for numerous stations all along the railway track. Some of the bigger units of the iron and steel industry like the Tata Iron & Steel Company and the Steel Corporation of Bengal are also in a position to provide their own wagons to be used by railways for the transport of their raw materials and finished products if a specially low transport rate is offered in consideration of the use of these wagons, as is done in foreign countries.

The war having ended the Government is planning to build more railways and roads, to improve and extend the existing means of communication. This programme offers a golden opportunity of correcting some of the mistakes of the past and the defects of the existing transport system. So far as the railways are concerned they have received comparatively more attention in the recent past and the structure of the system as a whole is sound. Their main defect is the lack of branch and subsidiary lines in many regions which need a good network of railway routes. Owing to heavy density of population and level nature of land, offering few obstacles to railways, the Indo-Gangetic plains are very well provided with railways, the only important tracts requiring immediate improvement in railway communications are the Attock and Shahpur districts in the Punjab, the Hamirpur, Banda and Mirzapur districts in the U. P. and the Shahabad, Palamau, Hazaribagh and Ranchi districts in Bihar. But in peninsular India such areas are considerable. In the C. P., Saugor, Damoh, Chhindwara, Seoni, Nimar, Baitul, Amracti, Buldana, Akola, Yeotmal, Balaghat, Bilaspur, Raipur and Drug; in Bombay Khandesh, Nasik, Thana, Ahmednagar, Ratnagiri, Satara and North Kanara; and in Madras South Kanara, Malabar, Coimbatore, Salem, Nellore, Godavari, Vizagapatam and Ganjam districts contain extensive areas which are more than 10 miles away from any railway track. If a line be drawn through the cities of Allahabad, Gaya, Ranchi, Chakradharpur, Cuttack, Vizagapatam, Hyderabad, Chanda, Jubbulpore and Katni, it will roughly enclose the region most backward in railway communications in the whole of India.

Most of these areas are not very sparsely populated. In general, they contain a population of one hundred persons to a square mile. There are difficulties, no doubt, in these regions of terrain and the backward nature of trade and commerce, which make railway construction difficult and costly. In spite of those drawbacks, improvement in railway communications in these regions, by providing branch and subsidiary lines, is certainly desirable and should be undertaken in the post-war period, if an even distribution of industries, commensurate with the resources of different regions throughout the country, is accepted as the ultimate aim.

In the matter of roads, the government plan is to build nearly 4,00,000 miles of new roads of various classes. So far as

the village and district roads in this programme are concerned, we are in complete agreement with the government plan. These roads will lead to the introduction of motor transport in rural areas, which will be of very great advantage and benefit to the rural population as well as to trade, industries (both rural and urban), agriculture and general prosperity of the country as a whole. It is said that 'in England the road leads everywhere.' Similarly the picture of the rural India of the future, that we imagine, is one in which motor transport will penetrate to the remotest villages, connecting them with the main transport system of the country, and play an important part in the marketing of agricultural produce and the distribution of the consumers' goods between the village and the town and vice versa.

But the scheme of a 'network of national highways linking the Bay of Bengal with the Indian Ocean, the Himalayas with Ceylon and India herself with Persia in the west and China in the east' does not fit in with our future plan of decentralization and regional distribution of industries. Two of these new and improved highways are to radiate from Bombay to the Khyber Pass (via Ahmedabad, Karachi and Peshawar) and to Cape Comorin (via the west coast). Bombay is also to be linked up with Madras and Vizagapatam. From Calcutta three main highways are envisaged, the first into Assam, which will link up with the military roads into China and the Lushai Hills and ultimately with the Burma Road, the second into Chittagong and Arakan and the third to Madras. These highways, no doubt, will be of great strategic importance to the army in India but from the point of view of the future industrialization of the country they will only improve further the transport relations of cities like Bombay, Calcutta and Ahmedabad, already well provided with transport facilities at the cost of other towns and cities and further aggravate the excessive concentration of industries in these cities and the surrounding regions.

In order to achieve the object of securing a better regional distribution of industries in the post-war period the scheme of national highways referred to above will have to be modified considerably. As far as possible the new roads and railways should aim at opening up comparatively less developed regions of the interior and providing additional access to several smaller ports scattered along India's extensive coastline. Loading, unloading and harbour facilities in these ports should also be

improved. This may not only lead to an increase in maritime trade activities but may also provide fresh and additional outlets to the sea to some of the regions at present solely dependent upon one of the four main ports—Bombay, Calcutta, Madras and Karachi. Such diversion of traffic may ultimately lead to the establishment of some new industries in these regions opened up by new roads and railways and served by new ports.

It will be seen from the foregoing discussion that there has been little co-ordination and community of interests between the means of communication and the industrial development of the country in the past. The existing means of transport (mainly railways), their freight rates and transport policies have not been favourable to an even and orderly industrial development of the country. The plans for the post-war development of communications also appear to be biased in favour of import and export trade and agricultural economy. These schemes also disclose the shortcomings of unco-ordinated and piecemeal economic planning. The authority responsible for the planning of future development of means of communication should be in close touch with the future needs and requirements of industries. A network of communications represents the ground plan of the industrial edifice of the country and as such will greatly strengthen the industrial structure. Only the pious wishes and declarations of the Hon'ble Member of the Government of India responsible for Development and Planning are not enough to bring about 'regionalization and the dispersal of industries'.¹⁸ One of the most essential preliminaries of such a distribution of industries is the existence of an efficient and well co-ordinated network of all types of means of communication—urban, suburban and rural, land and water. Any future plan that gives preference to the needs of the movement of agricultural produce and raw materials to the principal ports is not at all likely to assist the establishment of new industries or their wide dispersion. Till now the public is not aware of any government schemes regarding the development of inland waterways,¹⁹ coastal

18 Sir Ardesir Dalal's statement (New Delhi, September 14, 1944).

19 In the first week of February, 1945, the Government of India decided to set up a Waterways Commission—a Central fact-finding, planning and co-ordinating organization. The Commission will examine the potentialities of India's rivers from all relevant aspects and will assist the co-ordinated and multipurpose development of rivers passing through more than one province or state.

traffic, the small ports and the linking of such ports with the interior. Such schemes are essential for the future industrial progress of the comparatively backward regions. Similarly in the interests of health and welfare of the industrial workers of the large industrial cities like Cawnpore and Calcutta special suburban transport schemes to provide suitable means of conveyance from the suburbs and neighbouring villages to the factories are urgently required.

The future plan for the improvement of the means of communication should be sufficiently broad-based and comprehensive; it should anticipate the future needs of all types of economic activity of the nation including agriculture, and should ensure an adequate provision of cheap transport facilities in all the regions of India. It should also shift the emphasis from international to intra-national aspect of our trade and commerce. Only then the means of communication can best serve the needs of the decentralized industries.

CHAPTER XII

INFLUENCE OF THE PROXIMITY OF SKILLED LABOUR

In determining the location of particular industries the distribution of natural resources and markets plays the most important part and the position of labour, in this respect, is only auxiliary. Usually labour does not determine the location of industries but rather adapts itself to vary with the kind of production which other elements of a more permanent nature bring about. The state of supply of labour of a particular type on a certain date or time is not of great significance as it can be eventually changed and modified. Unskilled labour may become skilled, and labour trained for one kind of work may sometimes easily acquire the skill necessary for a different sort of job and thus change over to another group. The supply of various grades of labour will, consequently, within certain limits, be able to adjust itself to demand.

In spite of these broad possibilities of adjustment, the proximity of skilled labour is an additional factor in helping an industry to establish itself firmly, and the value of the factor need not be under-estimated. A well-organized labour market for the various grades of labour is often the most important requirement of success in industries where the skill of the workmen is of great account. The labour might play only a minor part in attracting an industry as against other locational factors, but it is an important element in promoting its growth and the most important factor in enabling it to hold its own against all odds after its establishment. The example of the linen industry of Northern Ireland and Southern Scotland may be taken as an illustration of the power of skilled labour to enable a particular region to retain an established industry under vastly changed circumstances. A century ago these countries grew flax and possessed flourishing industries for the manufacture of linen. At the present time the cultivation of flax has passed on to low-wage countries like Belgium and the Baltic States, but the technical skill of generations has enabled Northern Ireland and Southern Scotland to retain some of the world's finest linen factories.

Then again, the question of an adequate supply of skilled or semi-skilled labour has played an important part in the choice of the industries to be first taken up in industrially young countries like India and China. The first phase of modern industrial development in such countries has been the production of cotton textiles by means of imported modern machinery. In India and China, cheap and abundant raw materials and practically inexhaustible markets throughout the country were, of course, very important considerations; but the availability of skilled or semi-skilled labour in almost all parts of the country was the most important factor. Hand spinning and weaving for centuries had made a large part of the population, especially in textile production centres, familiar with the handling of fibres like cotton and wool and their manufacture into fabrics.

The modern cotton textile industry, as explained in the first chapter, came to be established at first at Bombay, which was an insignificant place before the establishment of British power in India, and possessed no ancient indigenous cotton industry. The modern cotton mills had, therefore, to obtain their labour from Deccan, Konkan, Central India and the U.P. But the skill and training that make a textile worker are relatively inconsiderable, and it was found possible to train recruits with the help of foremen obtained from Lancashire.

Later on, when the cotton mills were started in Gujarat, the Central Province, and the United Provinces, the labour supply of the Bombay industry became contracted. The major part of Bombay's labour is obtained from within the province itself, the district of Ratnagiri being the chief source. The density of population in this district is as high as 694 persons to the square mile and its precarious agriculture is not able to support it. Thus nearly 40 per cent of the total labour force of Bombay is recruited from this district.

The workers in Bombay city are in close contact with the villages from which they come. Those hailing from the neighbouring districts, who either own landed property or whose families have rented lands, go back to their villages every year before the beginning of the monsoon and return soon after the rains are over. In the month of April and May there is a regular exodus, mostly to the Konkan. Workers who do not own land go once a year. Those coming from Northern India go home once in two or three years but stay for three to four months at a

time.¹ The workers belong to the classes known as the untouchables or the depressed class: the Dheds, Mahars, Chamars and Mochis and also the Marathas. Among the Mahomedans Sheiks and Julahas predominate.

Although the Bombay textile workers maintain a very close and living contact with their villages, the bulk of them are permanent textile workers in the sense that they are not mere birds of passage but continue to work in the industry for a considerable period of time once they join it, and their long association with the industry, according to Mr S. M. Rutnagur, is bringing about certain changes of a permanent nature in the character and composition of the labour force. He observes: 'The bond to the land is becoming weaker, and a new generation is growing up, born of mill workers, and earning at the age of 14 years Rs. 20 to 25 per month in the mill. This generation knows nothing of the field work, and are less fit for it physically than the parents, so the children will grow up as mill hands, without being ever bound to the work for life as the Lancashire man is obliged to do.'²

The composition of the labour population of the inland towns like Ahmedabad, Sholapur or Nagpur is more homogeneous and permanent than that of Bombay. In Ahmedabad and Sholapur 60 and 64 per cent of the population respectively were born in the city, whereas the corresponding percentage in Bombay was only 16 per cent.³ Some Deccani and Konkani labour is permanently settled in Ahmedabad. About 20 per cent of the labourers in Ahmedabad come from the city proper. This class consists mostly of landless Mahomedan weavers and some Dhed spinners who have settled in Ahmedabad for many generations. About 2 per cent of the workers in this centre go to work daily from the neighbouring villages. Landless labourers such as Dheds and handloom weavers like Vankars have come to the city in large numbers. The Vankars have taken to spinning because, as untouchables, they may not work with the higher caste people in the weaving department.⁴ Mahars belonging to another untouchable caste have joined the throstle department.⁵

¹ Royal Commission on Labour in India, Evidence Vol. I, Part I, p. 7.

² S. M. Rutnagur: *Bombay Industries: The Cotton Mills*, p. 322.

³ Royal Commission on Labour in India, Evidence Vol. II, Part I, p. 162.

⁴ Royal Commission on Labour in India, Evidence Vol. I, Part I, pp. 7-8.

⁵ R. K. Mukerjee: *The Indian Working Class* (1945), p. 8.

Besides this settled labour, the remaining immigrant labour in Ahmedabad is not purely migratory. Once the workers come to the city they try to stick to their jobs and seldom, if ever, return to their villages for good. The workers, no doubt, go back to their villages for short or long periods but do not fail to return. Thus a very large majority of labour force at Ahmedabad is permanent, although workers without any connexion with villages form only about 20 per cent of the working class population. Ahmedabad has an advantage over Bombay in regard to the continuity of labour supply, having a more permanent factory population and a smaller amount of absenteeism.⁶

Coming to the Central Province, the labour at Nagpur is mostly indigenous and nearly 80 per cent is purely local. A large number of people from Chhattisgarh came to Nagpur during some famine and having found permanent employment in the mills settled down permanently. More than 54 per cent of the workers of the Empress Mills were Mahars (depressed class people) and nearly 22 per cent consisted of Kunbis, Koshtis, Gonds and Marathas. The whole of the labour force is permanent.⁷ The mills at Jubulpore also rely entirely on indigenous labour as nearly 90 per cent of the workers are local. The operatives are mostly Koshtis (a weaver caste), who live in a large village close to the mills.

In the United Provinces, at Cawnpore most of the labour is drawn from the neighbouring areas and some of the workers have settled permanently in the city. The labour in the textile mills in the early stages was provided mostly by Julahas (Mahomedan handloom weavers) and Koris (Hindu handloom weaver caste). The Koris were predominant in the weaving and reeling sections which is really the first process in hand weaving, their hereditary occupation. At present the bulk of the labourers is drawn from all the agricultural classes. Some old artisan castes like Chamars, Dosads and Lohars are also found working in the textile mills in quite large numbers. The work in the lime yards of the tanneries is undertaken only by the Chamars but in other departments dealing with tanned leather, Mochis and Mahomedans predominate. Some other depressed castes like Pasis

⁶ Report of the Indian Tariff Board (1927), Vol. II, pp. 138-139, and Vol. III, p. 61.

⁷ Royal Commission on Labour in India, Evidence Vol. III, Part I, pp. 65-100.

and Lunias have also joined the tanneries and the brushware factories in quite large numbers.

In Cawnpore it is estimated that at least 30 to 38 per cent of the workers regularly return to their villages for harvesting and substitutes have to be secured in their places. But there is always a number of workers in search of employment waiting at the factory gates in the city.⁸ On the whole the labour force in cotton and woollen textiles, leather and sugar industries is permanent.⁹

In Bihar, the iron and steel centre of Jamshedpur was located practically in a virgin forest but a fairly stable labour force was secured very soon. The unskilled workers were largely drawn from amongst the aborigines of the neighbouring areas. Besides this, the town received two important streams of migration. One began with the construction of the railway from Bilaspur and Raipur; and about 7,000 workers arrived in 1920 in another stream from Chhattisgarh side. About 75 per cent of the skilled and 50 per cent of the unskilled labour from Singhbhum and the contiguous districts worked continuously throughout the year.¹⁰ At the present time 39.3 per cent of the workers may be considered as a permanent labour force of the Jamshedpur area, including of course the aborigines, who came to work in the various organized industries from the surrounding villages. For Jamshedpur or Tatanagar town proper, the percentage of the settled population will be higher.¹¹

In the province of Bengal, in the Hooghly jute mill area only about 22 per cent of the total labour force could be said to be strictly permanent, of which about 17 per cent was Bengali; thus only about 5 per cent of the non-Bengali labour was permanently settled in the mill areas. But about 90 per cent of the workers were entirely dependent on the jute mills for employment and had no other occupation to which they could readily turn, apart from cultivation in their own villages.¹² The importation of the workers from the areas outside Bengal has tended to make the labour employed in the jute mills somewhat migratory in character, and it is the rule rather than the exception for

⁸ Mukerjee, *op. cit.*, p. 8

⁹ Royal Commission on Labour in India, Evidence Vol. III, Part I, pp. 242-49.

¹⁰ Royal Commission on Labour in India, Evidence Vol. IV, Part I, p. 6.

¹¹ Mukerjee, *op. cit.*, p. 10.

¹² Royal Commission on Labour in India, Vol. V, Part I, p. 279.

such workers to leave annually for 2 or 3 months. But an increasing number of such workers is becoming permanently domiciled in the mill areas.¹³

The supply of labour in the province of Madras is plentiful. No less than 95 per cent of the inhabitants of Madras city were born in the province and of these two-thirds were born in Madras city. The proportion of sexes was also fairly equal.¹⁴ The labour in the Buckingham and Carnatic Mills is all obtained locally and is now practically on a hereditary basis. The Mills have been in existence for over half a century and lately there has been an increasing tendency for succeeding generations of the same family to work in the same factory. The methods of recruitment followed are such that family life is not affected. Practically in all cases workers are living with their families. The labour is very settled, there is no migration and almost all the labour here can now be considered permanent.

The Royal Commission on Labour in India envisaged that in special areas and for special purposes the growth of a purely industrial population was inevitable. The foregoing discussion shows that the growth of industrial population of our important industrial towns like Jamshedpur, Madras, Nagpur, and Ahmedabad has almost reached that stage. The industrial population of such towns can be described as fairly permanent and stable, and this element of permanence and stability has been mainly responsible for the development of a class of skilled workers in most of the industrial centres. It is largely due to the development of this class of skilled workers in close proximity to the industrial centres that the Madras drills now compare very favourably with English drills and the finer types of saris, dhoties and shirtings from Ahmedabad, Sholapur, Bombay and Nagpur and coatings from Madras have practically driven out of Indian markets similar foreign products. The Rt. Hon. T. Shaw, M. P., paid a glowing tribute to the achievements of the skilled textile workers of India in the following words: 'The classes of goods made, too, were a revelation. I venture to say that none of the delegates thought that technical development had gone so far as it has done in India. Many of the manufacturing processes were fully equal to European standards, and in some cases the variety of yarn spun and cloths woven, dyed and finished showed

¹³ Report on the Marketing of Jute Products (Second Report), (1941), p.39.

¹⁴ Royal Commission on Labour in India, Vol. II, Part I, p. 162.

a range and variety which is probably not equalled by any individual European concern.¹⁵

In the group of iron and steel and metallurgical industries also we are forging ahead very steadily. In this connexion the following remarks of Sir Thomas Holland, a former Director of the Geological Survey of India, about the development of skilled labour at Jamshedpur, are worth quoting: 'Any one who has visited the Tata Iron and Steel Works will come away thoroughly convinced with the conclusion that with Indian labour you can tackle any industry for which the country is suitable. I have seen labourers at Sakchi, who only a few years ago were in the jungles of Santals without any education. They are handling now red hot steel bars, turning out rails, wheels, angles of iron, as efficiently as you can get it done by any English labourer. You cannot have a better test of the quality of labour and you cannot be prepared for more satisfactory results.'¹⁶

With regard to accuracy in work and the sense of responsibility of the Indian skilled workers Dr R. K. Mukerjee in his recent book, *The Indian Working Class*, has given the following remarks of the Manager, Kumardhubi Engineering Works and Eagle Rolling Mills: 'Our machine shop is a department which stands out head and shoulders. Now, we have got at least 20 per cent of the men who can use the micrometer and know what it means to machine to 1/2000th to 1/3000th of an inch and can do it as people in England can. They thoroughly understand accurate work.'¹⁷

Under the existing conditions these achievements of the skilled workers of India in quality of work done are quite admirable but in the matter of output they are not yet at par with their western compeers, although the progress made in this direction also is very encouraging: 'Not only has the industrial efficiency of the industrial workers steadily developed all along the line in recent years but in some fields they have achieved superb results. Weavers in some mills in Bombay Presidency have already begun to mind 6 looms and their average individual output has already reached 85 per cent of the output of the Lancashire workers in spite of the inferior working

¹⁵ Report of Investigations into Conditions of Indian Textile Workers (1927), p. 19.

¹⁶ Quoted by Mr B. P. Adarkar in *The Indian Fiscal Policy* (1941), p. 59.

¹⁷ Mukerjee, *op. cit.*, p. 199.

conditions. In the Tata Iron and Steel Works the labour coefficient has been estimated to reach about 75 per cent of European and American efficiency in some departments.¹⁸

The workers cannot be wholly blamed for their inferiority in efficiency and output. The higher efficiency of labour in a particular place or country is a matter not only of skill and training of the workers but also of difference in industrial management. Inequalities in the productive capacities of workers often arise from differences in machinery and processes of production, the whole technological milieu. In many cases the buildings, plant and machinery, general working conditions and supervision in India are inferior to those of the western countries. Besides this, on account of his comparatively poor physique and the warm climate the Indian worker is not capable of undertaking so much physical exertion with alertness as a European worker with a better physical build can do. Low wages, ill-balanced dietary, sickness and depressing living conditions are generally responsible for the poor physique and lack of endurance of the Indian worker.

The skilled workers in various categories have been generally drawn from the ranks of unskilled workers and now form a considerable proportion of workers in India, estimated at 26.9 per cent in 1921 and obtaining wages at a higher rate than that for unskilled workers.¹⁹ Intelligent unskilled workers as soon as they pick up skilled work are promoted from lower to higher ranks. Many women workers join the cotton mills in Bombay as half-timers drawing only Rs. 4.8 a month, then pick up skill and are admitted as full-time workers earning Rs. 25 a month within three to five years. Boys begin as half-time doffers earning only Rs. 3.8 a month and become full-time workers in the same department earning double the wages within the same period. Then they become siders in the throstle department and end as doffer jobbers earning Rs. 50 a month within another five years. Similarly in the jute mills in Bengal a boy starts as a shifter earning Rs. 4 a week, very soon becomes a spinner and learning weaving by going in his recess to the weaving department to help his associates from his own village, ends as a skilled weaver, earning Rs. 10 a week.²⁰ In the Buckingham and Carnatic Mills the boys trained in the mill schools begin as half-timers in carding

¹⁸ Harold Butler quoted by Dr R. K. Mukerjee in *The Indian Working Class*, p. 199.

¹⁹ Mukerjee, *op. cit.*, p. 198.

²⁰ *Ibid.*, p. 198.

and spinning departments and as vacancies occur they are promoted to other departments.

The localization and progress of various industries in important industrial centres have to be viewed in the light of the development of this class of skilled industrial workers in these centres. Some of the differences in the quality of the product and the success of the industry between centres like Bombay and Ahmedabad are directly traceable to the differences in the development of the class of skilled industrial workers. One of the reasons of the superiority of Ahmedabad over Bombay is the superiority of the skilled workers of Ahmedabad over those of Bombay.

On the whole, the Indian workers of the skilled categories have done very well under the existing circumstances. But now the industrial development of the country has reached the stage beyond which further progress is largely dependent upon the emergence of an important class of highly skilled workmen and technicians. We are nearing self-sufficiency in cotton textiles but high class fine fabrics are yet imported from England; we possess 57 per cent of the jute looms in the world, but our jute mills still concentrate largely on the manufacture of commoner classes of hessians and sacking, and the production of finer types is still in the hands of Dundee manufacturers.²¹ We are producing more sugar than we require but only 50 per cent of India made sugar is comparable to Java made in colour and grain, only 3 per cent stand comparison with foreign sugar in lustre, and a substantial part is inferior to that of Java in keeping quality.²² Indian skins are of high grade and suited for first class work, but from these skins Indian tanners have not been able to produce finished goods of any thing like the quality that can be manufactured from them in Europe and America. Our pig iron is much cheaper than the British product but the same thing does not hold good in the case of Indian steel.²³ We are nearing self-sufficiency in steel but do not fabricate machinery.

Why are we lagging behind in all these higher spheres of industrial efficiency? Largely because the general level of efficiency of skilled workers and technicians in this country with certain exceptions is lower than in older industrial countries. The superiority of countries like Britain, France and the U. S. A. in the

21 Report on the Marketing and Transport of Jute (1940), pp. 5 and 243.

22 Report of the Indian Tariff Board on Sugar (1938), p. 85.

23 P. S. Loka Nath: *Industrial Organization in India*, p. 70.

production of goods of high quality is mainly due to the extraordinary skill of the worker, which has descended through generations of handicraftsmen, and to the best kind of technical training.

The achievements of some of India's leading industrial establishments like the Tata enterprises, in this respect, prove beyond doubt that the technical skill of a high standard is not the monopoly of any nation and can be acquired by any country desirous of possessing it and prepared to make the necessary investment. Some of our post-war industrial ambitions are to export abroad a part of our sugar output, to replace raw and dressed leather with fully tanned leather in our export trade and to take up the manufacture of plant and machinery, automobiles, aircraft and ships. In order to achieve these objectives the level of the quality of India made goods will have to be raised to the international standards, and that will be possible only by bringing into existence a huge army of highly skilled workers and technicians, because in the higher grades of industrial production like the fabrication of machinery the workers are of little or no use unless they reach a definite standard of performance.

The emergence of a large class of highly skilled workers is mainly dependent upon the existence of a well settled labour force of a permanent nature devoting itself entirely to industrial occupations. As pointed out earlier in this chapter, such a class of purely industrial workers is coming into existence slowly and it is wrong to regard the Indian industrial worker as essentially a part-time agriculturist, because a number of artisan and depressed classes of workers like the Julhas, Koris,²⁴ Mochis, Chamaras, Mahars and Pasis had always very slight or precarious connexion with the land. Besides they suffer from a number of social and economic disabilities in the rural areas and as the village can offer little to these classes a definite severing of connexion may be advantageous. The landless labourers belonging to these classes, who seek employment in the organized industries, are prevented from bringing their families and settling down permanently in the industrial areas by instability of employment, chronic house famine and high rents,²⁵ and any substantial improvement in these conditions is bound to encourage

²⁴ The castes resembling Koris (Hindu weavers) are known as Tanti or Tatwa in Bengal, Koshti and Panka in the C. P., Sali and Koshti in Bombay and Sale and Kaikolan in Madras.

²⁵ Mukerjee, *op. cit.*, p. 7.

the growth of a definitely urban class of factory workers.²⁶ The progress towards permanent settlement of purely industrial workers in the factory area will facilitate the adoption of social security measures like the sickness, disability and unemployment insurance schemes, so essential for the promotion of an efficient class of skilled industrial workers.

The progress of industrialization in the country has now created conditions favourable for the development of a class of highly skilled workers and technicians from amongst the industrial workers settled permanently in the industrial towns. The regional unit of labour force formed by the industrial workers in the cotton mills clustered around the city of Ahmedabad is sufficiently large to provide ample scope for the realization of the highest ambitions of intelligent skilled workers and technicians. A promising youth may start on his career as an humble apprentice in a cotton mill located in one of the small towns of the region and may finally end by occupying a high position of responsibility and trust in a mill at Ahmedabad situated in the same region. Equally important regional units of labour in the cotton and leather industries exist in Southern India between Mysore, Madras and Tuticorin, in the jute industry in the Hooghly riverain between Bansberia and Birlapur, in metallurgical industries in a triangular region between Calcutta, Asansol and Jamshedpur, and in the sugar industry in the U. P. and Bihar. Besides these there are a number of smaller regional labour units in the cotton, sugar and leather industries in many other regions of India. From this point of view, the cotton industry of Bengal and the woollen textile industry as a whole are at a disadvantage. But in course of time a regional labour unit of a moderate size is likely to be developed in the Punjab for the woollen industry in the region represented by the towns of Dhariwal, Amritsar and Ludhiana. Such regional units may form the basis of the organization of industrial labour on modern lines, leading to the development of skilled labour in the various branches of the modern organized industries of India.

The end of hostilities will most probably mark the beginning of the second stage of the industrial development of India, as a number of new heavy basic industries and higher branches of the existing industries are likely to be taken up on a planned basis. The supply of skilled workers and technicians will be

²⁶ Report of the Royal Commission on Labour in India, p. 20.

one of the main problems facing the country in the beginning of such programme of new development. The 'Bevin Boys' and other skilled personnel trained during the war may provide a nucleus. Under the Government of India scheme for training skilled workers and technicians, 51,690 workers passed out from the various training centres up to August, 1943.²⁷ They are mainly trained as fitters, carpenters, blacksmiths, turners and electricians but they also receive some general instruction in engineering and building. The total number of trained workers mentioned above is employed in military and civilian industries in the following manner: Indian Army 45,066, I. A. F. 1,150, R. I. N. 335, Ordnance Factories 2,690, civilian industry 2,322 and Civil Pioneer Force 124. The 'Bevin Boys' training scheme is intended to train supervisory personnel. Under this scheme 354 candidates had been sent up from India by August 1943; 263 had returned from England after receiving the necessary training. But the main problem will have to be solved by providing training facilities on the basis of regional units suggested above. The future prospects of raising the level of the industrial efficiency of India to the international standards will depend very largely on the supply of the necessary skilled and technical labour of the right type.²⁸

27 The position of the scheme on December 31, 1944, was as follows:

Number of persons passed out and posted 85,018

Number of persons under training 21,545.

28 A Technical Training Scheme to train craftsmen for the war time and post-war needs of civil industry is under the consideration of the Government of India. The duration of the training will be three years, of which the first 18 months will be spent in a government training centre and the next 18 months in a factory. The cost of training in the government training centre will devolve on the government and that of training in the factory on the employer concerned. The training will be organized on a national scale and will lead to a national certificate in order to ensure the standard of craftsmanship. Regional Training Committees, under the National Council of Technical Education, will be set up in the provinces to carry out and supervise the scheme.

The Government of India have also set up a Committee under the chairmanship of Mr N. R. Sarkar to consider the establishment of a high grade Technological Institute in India, possibly on the lines of the Massachusetts Institute of Technology to provide advanced instruction and training in Technology.

CHAPTER XIII

THE PROSPECTS OF RURAL INDUSTRIALIZATION

India began her march on the road to modern industrialization as late as the latter half of the nineteenth century but she ranks today as one of the eight greatest industrial nations of the world and is regarded as the economic reservoir of the British Empire to the east of Suez. In spite of this progress the state of her industrial structure is far from being satisfactory. Taking her vast natural resources into account, the existing development is very much ill-balanced and meagre and consequently she continues to remain a rich country inhabited by the poor. The most glaring weaknesses of the Indian industrial structure are two-fold—first, the main structure consists of the consumption goods industries and lacks the strong steel frame provided by the basic capital goods industries; secondly, there is a wide chasm between the social and economic conditions of modern industrial centres like Bombay, Calcutta or Jamshedpur and the backward rural areas, such as, some parts of the provinces of Bihar and Orissa. The lack of capital goods industries militates against the economies in the initial capital costs of installation of new plants and the further industrialization of the country. In normal times the setting up of a new plant in India imported from abroad costs nearly three times as much as it does in the country of its manufacture. The Bombay Mill Owners' Association were of the opinion that the setting up of a cotton mill with 50,000 spindles in Lancashire would cost only about £50,000 to £60,000, while the same type of mill in Bombay would cost as much as £150,000.¹ In the inland centres like Ahmedabad this cost might go up by a further 10 per cent. Some of our present difficulties in obtaining capital goods for further industrialization of the country and spare parts and accessories for the maintenance of the existing plant at an efficient level of production are too well-known to need any description. For every plant that we want to put up and for spare parts for the existing units we have

¹ Report of the Indian Tariff Board on Cotton Textile Industry (1927), Vol. II, p. 14.

² *Ibid.*, p. 136.

to await the pleasure of the foreign countries like the U.S.A. and Britain. No better proof of our helplessness and sad plight in this respect can be given than by citing the cases of two aluminium companies from the representation made to the Government of India by the Engineering Association of India. Of the two existing aluminium companies, the Aluminium Production Co. Ltd., registered in Travancore and financed by the Canadian interests has been working since 1943, while the Aluminium Corporation of India Ltd., near Asansol, which is owned by Indians, has not yet reached the final stage of operations, owing to its inability to get certain parts of machinery from abroad in war time. The net result of these handicaps has been that what our next-door neighbours, South Africa and Australia (comparatively much poorer in industrial resources), have found possible to accomplish in the manufacture of automobiles, ships and aircraft, has been impossible to achieve for India—the eastern economic reservoir of the British Empire.

The industrial backwardness and consequent poverty of the rural areas are obstacles to the growth of the existing industries, as they severely restrict the expansion of the consumers' markets in the country and prevent the growth of a class of highly skilled industrial workers. India is as yet predominantly agricultural and nearly 66 per cent of her total working population are engaged in agriculture. Nearly 87 per cent of the total population reside in 6,55,257 rural settlements, the majority of which contain less than 1,000 inhabitants each. In most of these villages there is no subsidiary occupation besides agriculture and the per annum per capita income of the average villager was estimated by the National Planning Committee to be somewhere near Rs. 30. This level of income—probably the lowest in the whole of the civilized world—which forms the basis of the purchasing power of the masses of rural India, should act as eye-opener to those who try to seek further home markets for the expanding large-scale industries of India. No doubt, the expanding industries would create further employment for a small fraction of the poor population but that will be a mere drop in the vast ocean of appalling poverty. In the absence of the medium and small-scale rural industries the pressure on land, with every increase in population, goes on increasing and the gulf between the social and economic conditions in the industrial cities and the rural areas, instead of being bridged up, goes on

widening. Besides a large number of partially employed members of the families of the agriculturists on account of the uneconomic nature of the agricultural holdings, there is a large body of landless agricultural labourers who cannot find any employment. Most of these agricultural labourers belong to the old artisan classes like the weavers and leather workers, who, on account of the loss of their vocations, have taken to ordinary manual labour in the rural areas. In 1931 there were 230 lakh landless labourers out of a total number of 315 lakh agricultural labourers. Owing to overcrowding in agriculture, a substantial proportion of these landless labourers cannot find employment and the earnings of the rest are very low. These conditions result in a great disparity between rural and urban wages and the respective standards of living. Perhaps there is no part of India where this disparity is greater than Bihar. Dr R. K. Mukerjee estimates that for every 25 non-cultivating landlords and tenants there are about 725 labourers in the province and in consequence 'the economic condition of the bulk of agricultural workers approximates to virtual slavery in considerable parts of Bihar and Orissa.'³ An excessive flow of labour from these agriculturally overcrowded rural areas exercises a very depressing influence on the standards of living and wages of the industrial workers in the adjoining industrial centres. And 'as long as the village remains backward in these respects as it is at present, it is difficult to see how the wages and manners of life of the urban worker can be substantially improved. His standard of living is constantly threatened by the influx of fresh workers from the country, anxious to get a job at almost any price, prepared to lodge in the most insanitary hovels and unaccustomed to any form of modern social organization.'

Thus without improving the economic condition of the masses in the rural areas substantial improvement in the wages and life of the industrial worker is impossible, and without improving the standard of living of the industrial worker his efficiency cannot be increased, and without the creation of a highly skilled working class the various industries of the country cannot go beyond a certain stage in the production of better-quality goods. In the existing circumstances the poverty of the masses sets a limit to the increase in the volume of the industrial output of the

³ R. K. Mukerjee: *The Indian Working Class*, pp. 4-5.

⁴ *Ibid.*, p.4 (Quoting Harold Butler: *Problems of Industry in the East*.)

country by restricting the consumers' markets, and the lack of efficiency on the part of the workers bars the way towards further progress in the quality of manufactures of the Indian industries.

The way to end this deplorable state of things is to find out means whereby industry is brought to the door of rural dwellers, i. e. rural industrialization. As each region has an advantage in the production of commodities into which enter considerable amounts of productive factors abundant and cheap in that region, the industries capable of absorbing comparatively more labour of all grades, so abundant and cheap in the rural areas, will admirably suit the requirements of these areas. Owing to limitations imposed by the lack of capital, managerial ability and means of transport on the size of units and the type of management it is reasonable to assume that the future of the industrial development of rural India lies in the direction of small-scale industries which may be financed and managed by the industrial co-operatives formed by the workers themselves and which may be carried on in the cottages either as principal occupations or as subsidiaries to agriculture.

The present tendency of the world is also towards dispersion and decentralization of industries. In the early stages of industrialization in the West, the use of steam power resulted in the concentration of large-scale industries near the coal mines but the efficiency of the modern power-house in giving more energy per unit of fuel consumed and the efficiency of the modern means of transport in arranging the transport of fuel over long distances at a cheap cost have come as liberating forces and the ever increasing use of electric power in the West for running industrial machinery has helped the decentralization movement still further. The steam engine in the factory is becoming obsolescent. To an increasing extent industry in the U. S. A. either buys its power or distributes it from its own power-houses. In either case it is electrical energy, whether hydro-electric or fuel electric.

As a result of these changes 'there is now a centrifugal movement of population definitely discernible in the great city, preceded or followed by an intra-regional dispersion of industry from the great city into the adjacent suburban periphery. There is no doubt that the city has become indispensable to civilized existence. At the same time the frustration of some of the major

satisfactions in modern urban life has called forth everywhere colossal efforts to find a judicious balance between agriculture and industry and to promote decentralization of industry on a large scale which may re-establish the village and the small town as parts of an organic system of communities, centering conveniently on the regional city.⁵ Mankind has hitherto generally conceived of two types of living and only two—urban and rural. The late President Franklin D. Roosevelt believed that we would look forward to three rather than two types in the future, for there is a definite place for an intermediate type between the urban and the rural, viz. a rural industrial group.⁶

In our country also we look to the development of electric power to break the monotony of unusually heavy concentration of industry in big cities, which creates a large number of social problems. Electric power admirably suits the requirements of small cottage industries, although it can be utilized equally advantageously by the large-scale industries. Fuel and water power resources of most of the densely populated regions of India for the development of electric energy of both types—hydel as well as thermal—are quite rich. The province of Bengal, Bihar and the C. P., where water power resources are limited or difficult to develop, contain good reserves of coal. Taking the increased efficiency of the modern fuel power station into account, where a large-scale plant can produce a unit of energy from less than one lb. avoirdupois of average bituminous coal, the use of coal for steam raising appears to be uneconomic and wasteful even in these regions and is perhaps a crime against posterity. The conversion of good coal, after the recovery of by-products, and of inferior coal directly into electricity is one of the urgent industrial problems of India awaiting solution. The conversion of coal into electricity will not only provide all types of industries in these regions with cheap electric power but will also result in the saving of two-thirds of fuel consumed in the industries and four-fifths consumed in the colliery furnaces⁷; such conservation is essential in the wider interests of the nation. The thermal electricity thus produced will probably be cheaper in all the thermal power regions.

⁵ R. K. Mukerjee: *Man and His Habitation* (1940), pp. 293-94.

⁶ *Ibid.*, p. 299.

⁷ P. S. Lokanathan: *Industrialization*, p. 18.

As regards water power most of the present estimates of the water power resources of India are mere conjectures, as no detailed and comprehensive survey has been undertaken so far. The Triennial Report of the Hydro-Electric Survey of India (1919-21) estimated the probable minimum continuous water power in India at 5.58 million K. W. But these estimates were largely based on mere guess work. At the present time many people regard 5.58 million K. W. to be a serious under-estimate and place the total water power resources of the country at about 27 million K. W., which compares very favourably with the potential hydro-electric resources of the U. S. A. During the last twenty years considerable progress has been made in the development of hydro-electricity in the provinces of Bombay, Madras, Punjab and U. P. and in the Mysore, Travancore and Kashmir States. But the total installed capacity of all the existing plants taken together does not exceed half a million K. W. and can stand no comparison with the development of electric power either in America or England. Mr H. M. Mathews, Electrical Commissioner, Government of India and Chairman, Central Technical Power Board, in his address on 'National Planning of Electric Development in India' to the Institute of Engineers on February 1, 1945, at New Delhi, said: 'The total energy generated in India in 1943 was approximately 3.578 million K.W., about the same as the weekly production of energy in the U. S. A. In the U. S. A. about 180 times as much energy is used per head of the population as in India, while the figure in the U. K. is about 100 times as much.' TABLE LV overleaf gives the installed and ultimate capacity of the principal hydro-electric and thermal power stations in operation in India. (Over 42 per cent of electrical energy generated throughout India is at present utilized in the cities of Bombay and Calcutta alone. Including Cawnpore and Ahmedabad, over half the output of the Indian electric supply industry is being absorbed in these four cities.)

Although with regard to her present output of electric energy India ranks last among the important industrial countries of the world, the potentialities of development are great and to quote from the Triennial Report of the Hydro-Electric Survey of India (1919-21),

No pent-up Utica contracts your powers
But the whole boundless continent is yours.

At the present time Sir William Stampe, Irrigation Adviser to the Government of India, is assisting the various provincial

TABLE I. V^E

governments in formulating plans for the post-war electric development in their respective provinces. The Government of India have also set up a Central Technical Power Board to execute the post-war electric power plans. Intentions of the Governments of the Punjab, Bombay, Bihar and the United Provinces regarding the establishment of electric grids to assist their plans of agricultural development by providing power for pumping are also well known. The Central and provincial governments are all committed to the policy of providing cheap electric power to villages and the rural areas; a Committee of leading power engineers has also been appointed to advise the government regarding the post-war requirement of electric plant. The report of the Committee has not yet seen the light of day but it transpires that the Committee is of the opinion that in the next few years plant worth Rs. 4,000 millions may be required, the immediate aim being the production of 7 million K. W. of energy. If the press reports with regard to these decisions are correct, as they are likely to be, electric development in the post-war period is going to be really very splendid and full of promise for the development of rural industries.

In the ordinary circumstances, hydro-electricity from individual schemes may not be generated in India at a cheap rate, because the rainfall in India is seasonal and the differences in the hot weather and monsoon discharges of most of the rivers are very great and abnormal requiring the construction of costly reservoirs.⁹ In the case of canal falls the initial capital outlay is heavy on account of the requirements of a special type of delicate and costly machinery. But by the establishment of Regional Grids, consisting of various types of plants—hydel and thermal—and various types of schemes—purely power as well as irrigation-cum-power—it is possible to reduce the cost per unit of the electrical energy and to make it available at less than 5 pies per unit.¹⁰

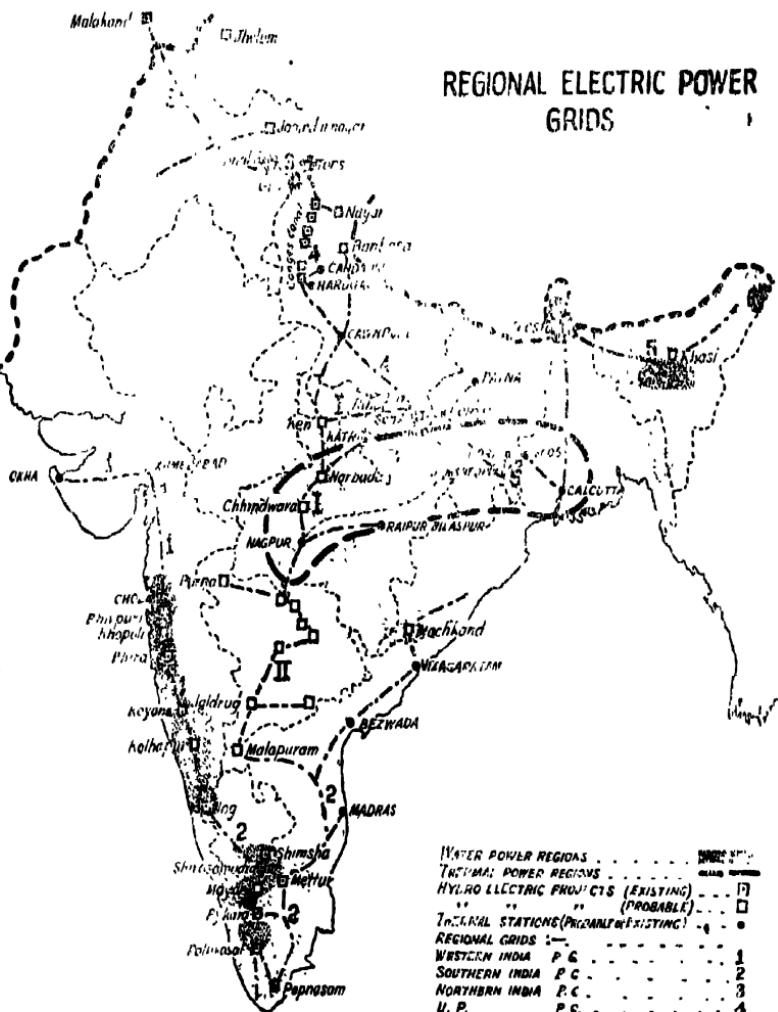
9 The remarks of the Triennial Report (1919-21) of Hydro-Electric Survey of India, give an idea of the differences in hot weather and monsoon discharges of the rivers of India:

Ken river tributary of the Jumna (C. I.)—Flood discharges are believed to be over 3,00,000 cusecs while the minimum in June is believed to fall to 5 cusecs. (p. 109.)

Tons river tributary of the Ganges (Himalayas)—The river is perennial but falls low in the hot weather; it carried 45 cusecs on 30th March, 1921, and is believed to go up to 4,00,000 cusecs. (p. 113.)

10 Lokanathan, *op. cit.*, p. 19.

REGIONAL ELECTRIC POWER GRIDS



| | |
|---|---|
| WATER POWER REGIONS | 1 |
| HYDRO ELECTRIC PROJECTS (EXISTING) | 2 |
| " " " " (PROBABLE) | 3 |
| TRANSMISSION STATIONS (PROBABLE & EXISTING) | 4 |
| REGIONAL GRIDS :- | 5 |
| WESTERN INDIA P.G. | 1 |
| SOUTHERN INDIA P.C. | 2 |
| NORTHERN INDIA P.C. | 3 |
| U.P. | 4 |
| EASTERN P.G. | 5 |
| INTER-CONNECTED SYSTEMS :- | 6 |
| C.P. & C.S. | 7 |
| HYDERABAD | 8 |

Most of the post-war schemes of the Government have not been made public but with our existing knowledge of the old and new schemes, it is possible to suggest the formation of the following regional grids, at least in outline, throughout the whole of India.

(1) *The Western India Power Grid*—Between port Okha in Kathiawar and Goa at the southern end of the province of Bombay the following electric plants are already in existence:—The Tata plants at Okha, Bhira, Bhivapuri and Khopoli, and the plants of the Ahmedabad Electric Supply Company and the G. I. P. Railway at Ahmedabad and Chola respectively. By interlinking these plants and connecting them with the future schemes in the valley of the Koyna river (with an ultimate capacity of 3,00,000 K. W.) and in Kolhapur (48,000 K. W.) a regional grid with an ultimate capacity of 7,00,000 K. W. could be obtained.

(2) *The Southern India Power Grid*—In this region the sub-regional grids are already in existence in the Mysore State (from Jog Falls to Sivasamudram) and in the province of Madras (from Pykara in the north-west to Papnasam in the south). If the Pallivasal scheme of the Travancore State and the electric system of the Mysore State are linked up with the Madras provincial grid, a complete regional grid from Jog Falls on the borders of the province of Bombay in the north to Papnasam in the south of the province of Madras can be established. With the possibility of some new additional schemes (like Moyar) the ultimate capacity of this grid can be stepped up to 6,00,000 K. W.

There is also a possibility of the northern districts of the province of Madras being provided with electricity either from the coal-fired plants at Bezwada and Vizagapatam or from a hydro-electric scheme to be developed in the Jeypore State on the river Machkand (1,00,000 K. W.) by the Government of Madras. If this scheme materializes, electricity will become available up to the province of Orissa.

Such interlinking of two or three systems, as suggested here, is quite possible because the electric power for the construction of the Mettur dam and its power-house in the province of Madras was provided by the Mysore electric system and for this purpose an overhead line was installed between the two systems.

(3) *The Northern India Power Grid*—In this region from Mala-kand at the northern end of the N.-W. F. Province to the western end of the U. P. the following schemes are already in operation :

The Malakand Hydro-Electric Scheme (N.-W. F. P.), the Jhelum River Scheme (Kashmir), and the Mandi Scheme (Punjab). Besides these the Government of the Punjab have sanctioned the construction of Bhakra dam—an irrigation-cum-power project—across the river Sutlej. This scheme is expected to generate about 2,00,000 K. W. The Governments of the Punjab and the U. P. are also financing jointly an additional scheme on the Tons and Giri tributaries of the river Jumna in the Nahan State, which is expected to develop about 75,000 K. W. continuous. A grid provided by the interlinking of these projects and schemes, along with the possibilities of further power development in Kashmir on the Jhelum (1,50,000 K. W.) and in the Punjab on the Chenab (30,000 K. W.), may have an ultimate capacity of 5,00,000 K. W.

(4) *The United Provinces Power Grid*—In the western part of the U. P. the Ganges Canal Hydro-Electric Grid is already in operation. The six falls on the Ganges Canal and the coal-fired plant at Chandausi have already been linked up. The preliminary work in connexion with the Tons-Giri scheme is being taken up. The power-house is to be located at a distance of 20 miles from Herbertpur (at the junction of Dehradun-Chakrata and Saharanpur-Chakrata roads). Kalsi project, a tributary scheme for generating electricity for starting the work of the major project, is under construction at the present time. A number of new schemes have been recently approved by a committee of experts. The most important of all these schemes is a project for the development of power from Rihand, a tributary of the river Sone. The power-house will be located near Piparia village in the Dudhi tahsil of Mirzapur district and the scheme is likely to generate 2,00,000 K.W. The remaining new schemes, besides these, are: (i) the construction of a dam -600 feet high—to provide water storage and power on the Nayar, a tributary of the Ganges near Lansdowne in Garhwal, (ii) a project for producing power from Sarda Canal near Banbasa, and (iii) the development of power on Betwa and Ken rivers. Detailed information regarding the capacities of most of these schemes is not available but it may be estimated that all these schemes along with the coal-fired plants at Chandausi, Harduaganj and Cawnpore may ultimately give about 4,00,000 to 5,00,000 K. W. The system will be able to provide power for the entire province from Dehra Dun to Mirzapur.

(5) *The Eastern India Power Grid*—The main section of this grid would lie in the provinces of Bihar and Bengal, comprising the coal-fired plants of big metal, mining, cement, paper and other industrial concerns. This section may be linked up with hydro-electric schemes that may be developed in the Himalayan foothills in Bengal such as the Teesta River project (60,000 K. W.) or in Assam such as the Umkyushi river in Khasi Hills (10,000 K. W.) and the Umngi river south-east of Shillong (20,000 K. W.). The estimated ultimate capacity of this regional grid may be about 7,00,000 K. W. Some hydro-electric energy may also be generated in western Bengal, if the problems created by the silting up of the Hooghly and the Damodar floods are tackled by undertaking certain dams in the valley of the Damodar. The problems of the port of Calcutta, Damodar floods and malaria in western Bengal are inter-linked and require a comprehensive solution, which might also give hydro-electricity to this region."

The future possibilities of the generation and utilization of hydro-electricity in the province of Assam are vast. Besides the use of energy by small-scale industries in villages, considerable power may be used by the tea industry, the rice mills, the timber mills and the Chhatak Cement Works. If power is available some more large-scale industries might also be set up in Assam. It is just possible that the Eastern Regional Grid might develop in two distinct sections—the one consisting of coal-fired plants, ranging from Rohtas to Calcutta and the other consisting of hydro-electric projects, running from Darjeeling up to the eastern frontier of Assam—and both of them may be linked up somewhere in Bengal.

- 11 The prospect of harnessing the Damodar river on the lines of the Tennessee Valley Scheme in America was recently investigated by the Central Technical Power Board with the help of Mr Voorduin, a project engineer of the Tennessee Valley Scheme, who has suggested the site for a dam across the Damodar river. The preliminary report of the Board indicated the possibility of the development of the Damodar Valley by constructing a series of dams on the river and its tributaries combined with anti-erosion measures in the river basin. This would ensure flood protection, generation of cheap electric power, irrigation, water supply and possibly also navigation at a later stage. Such a scheme would greatly promote the agricultural and industrial development of Bihar and Bengal. The establishment of a Damodar Valley Authority on the lines of the famous Tennessee Valley Authority of America is now being jointly considered by the Central, Bihar and Bengal Governments. The three governments are concerned in the multi-

Besides these grids there may be a number of interconnected electric systems to meet the needs of the remaining important regions of India. Some of these systems may be suggested below:

(1) *C. P. and C. I. Interconnected System*—The difficulties in the way of hydro-electric development in this region are probably greater than in any other region in India except the deserts. In this area the rivers are mostly not perennial, and the available falls can seldom be developed above medium height even with long channels. The 'head' in case of the majority of sites lies between the limits of 100 and 1,000 feet. At higher altitudes above plains level in this area the catchment areas are too small to give a useful yield, especially when highly variable annual rainfall and frequent failure of the monsoon are taken into account.¹² In spite of these difficulties some hydro-electric development is possible in Chhindwara hills and the Narbada river valley (80,000 K. W.). A large reservoir capable of producing 3,50,000 K. W. continuous can be built up on the Vindhyan Plateau, some 20 miles upstream of Gangao on the river Ken to provide power to parts of the U. P., the C. P. and a number of states in the C. I. But the possibilities of this site being utilized are very remote as considerable areas of good cultivated land, including a number of villages lying in the states of Panna, Bijaigarh and Ajaigarh and the Hatta taluk of Damoh district in the C. P. will be completely submerged. There is also the possibility of the development of hydro-electric power, on a less ambitious scale, on the river Sone, in Singrauli Pargana and the Rewa State. This scheme can give about 1,50,000 K. W. continuous. If some of these schemes materialize they can be linked up with the coal-fired plant at the industrial city of Nagpur to provide an interconnected system.

(2) *The Hyderabad Interconnected System*—The Government of the Hyderabad State has got a plan of its own to develop the following hydro-electric or irrigation-cum-electric projects:

(i) Tungabhadra Project (38,000 K. W. continuous), (ii) Devanoor Project (17,800 K. W. continuous), (iii) Nizam Sagar Project

purpose scheme which will embody gigantic hydro-electric and irrigation works, which will be entrusted to the Damodar Valley Authority, consisting of the representatives of the Governments of India, Bihar and Bengal.

¹² The Triennial Report of the Hydro-Electric Survey of India, (1919-21), pp. 22-23.

(2,800 K. W.), (iv) The Kaddam Project (4,000 K. W.), (v) Purna Project (4,000 K. W.), (vi) The Manair Project (700 K. W.), (vii) The Penganga Project (3,500 K. W.), (viii) The Godavari Project (65,000 K. W.), (ix) The Lower Kistna Project (50,000 K. W.), and (x) The Upper Kistna Project (30,000 K. W.). All these projects will be linked up in one system to provide in total about 2,00,000 K. W. continuous.

The development of these regional grids and interconnected systems might probably take half a century or more and might require capital investment measurable in millions of rupees. But when it is completed cheap electricity would be available for the millions of India residing in rural areas and by interconnecting different systems in the contiguous areas in a planned manner the establishment of an all-India power grid would also become a possibility. At present the maximum distance for transmitting about 2,00,000 K. W. at the maximum voltage of 287 K. V. is about 400 miles in the United States of America and there should be no difficulty in sending energy from one system to the adjoining areas of another system under emergency conditions such as the destruction of a power-house by an earthquake, coal-miners' strike, the bursting of a dam or total or partial failure of monsoon in a particular region, or a temporary occupation of coal-mining region by an enemy power. Only in this limited sense we can think of an All-India Power Grid.

The achievement of the ultimate goal might take a sufficiently long time but the Government of India are quite optimistic about the generation of nearly 7 million K. W. in the immediate post-war years. This will be quite good to start with and will be able to provide energy for a variety of new industries. In Kashmir, the Punjab, the U. P., Mysore and Madras, wherever electric power has come, it has given a great impetus to the development of industries and in general has helped the dispersion of industries in rural areas. In Southern India, especially in the province of Madras and the Mysore State, electric power has reached a very large number of rural towns and villages and is being utilized in cotton spinning mills, cotton, wool and silk power-loom factories, flour mills, ginning factories, tea factories, rice mills, etc. in these localities. In the Punjab electric power is being utilized in power-loom factories manufacturing hosiery, cotton, art silk, staple fibre and woollen goods as well as mixtures; in the U. P. hydro-electric power from the

Ganges Canal grid is being used for running flour mills and cotton ginning factories, for polishing brass and other metals and for sugar processing. Thus it will be seen that the available supplies of electric power in southern and northern India are at the present time being utilized in the following three types of industries: (i) textile mills situated in larger towns and the power-loom factories in small towns and villages; (ii) factories processing agricultural produce situated mostly in the rural areas; and (iii) small metal-working factories located in big and small towns.

This is a most welcome move in the right direction, and similar rural industrialization is expected to follow in other areas and regions wherever electric power is made available. Of the industries likely to become most wide-spread in the rural areas by the introduction of electric power the most important industry is the manufacture of all kinds of cotton and woollen textiles. At the present time the cotton handloom industry occupies a very important place among the textile industries of the country. Out of the present output of 68,000 lakh yards of cotton cloth the handloom industry accounts for the manufacture of no less than 20,000 lakh yards. Even in the pre-war years the total normal output of the handloom industry was between 13,000 and 14,000 lakh yards of cloth as compared to 42,000 lakh yards of cloth produced by the cotton mills.

The future of the handloom industry in its present form, however, does not appear to be very bright in the post-war period when the electric power will be available to operate the domestic power-loom. In spite of the sentiments and desire of so many people to restore the handloom cotton textile industry to its original importance, it is practically certain that the handloom industry as such must lose ground, but probably without causing much hardship to the handloom weaver, who will be able to take to the modern domestic power-loom very easily.

Whether it be a handloom or a power-loom, an efficient unit of production is what is required. One of the essential causes of the present uneconomic condition of handloom weaving is the lack of proper organization of the handloom production in its various stages. The process of weaving may be carried on profitably on a small scale in order to meet the special demands of small groups of customers according to differences in tastes but the same scale of operations is not necessary in the earlier process of the preparation of thread for weaving or in

the later process of finishing of woven cloth. They are all amenable to large-scale operations.

During the last twenty years several suggestions have been made for organizing the handloom industry on such lines as to permit the different processes of manufacture to be carried on on different scales of production. Mr B. Papaiya Chetty referring to the organization of the handloom industry, in his evidence before the Indian Fiscal Commission, said: 'In this connexion I should like to propose the establishment of a "linked system" which is adopted for the handloom industry in Switzerland. There a number of looms are linked to a factory which does all the preliminary work of spinning, warping, and beaming and the weaver begins his work direct with weaving. By this system the weaver saves a lot of time which he used to spend upon the process uneconomically and is thus able to produce more cloth than before.'¹³ Mr D. M. Amalsad, Textile Expert to the Government of Madras, also had the same thing in mind when he suggested to the Indian Tariff Board on Cotton Textile Industry (1927) that the spinning mills might with advantage distribute prepared warps to handloom weavers.¹⁴ In his pamphlet, *The Finance and Structure of Industry*, Dr R. Balkrishna has also recommended 'the institution of a central organization where winding, warping and sizing of yarn may be undertaken on a large scale.'

A most comprehensive and vivid description of the circumstances, requirements and organization of the future textile industry of the rural areas of India was given by Sir Victor Sassoon, one of the foremost industrialists of Bombay, in his inaugural speech at the All-India Textile Conference, held at Bombay on March 9, 1944. Referring to the future of the light power-loom in the light of the post-war electric power development in India he said: 'I would draw attention of keen young-men to the policy that the central and provincial governments have all been committed to, namely, the provision of cheap electric power to villages and to rural industries. Equally there is a big possibility in this country for the development of the manufacture of a light power-loom with small electric motors,

¹³ Minutes of Evidence recorded by the Indian Fiscal Commission (1923), Vol. III, p. 596.

¹⁴ Report of the Indian Tariff Board on Cotton Textile Industry (1927), Vol. III, p. 105.

so that the purchase of small number of these looms and motors would be within the reach of any small capitalist, particularly one with technical knowledge of the industry.

'By establishing a combination of the light power-loom industry with a central preparatory system, an advance will be made in the productive capacity of the rural district, and labour will not be herded into big cities with the accompanying development of slums. Small plants of this type, taking advantage to the full of the technical skill and knowledge, would enable India to compete in quality and price with any country, especially if such enterprises were marshalled into co-operative movement, whereby the financing of supplies of yarn and the marketing of the finished cloth could be done from one centre. For many cloths it would be necessary to set up central co-operative finishing plants, though it is surprising how the craftsmen of this country can produce finishes which imitate machine produced finishes.'

Some of the conditions essential for the establishment of the system advocated in the speech referred to above are already in existence in two important regions of India, where there is a great possibility of future development of textile industries. In southern India, especially in the province of Madras, a large number of purely spinning mills established in small town throughout the southern section of the cotton belt are already feeding with yarn the most important weaving section of the rural textile industry of India. In another region from Delhi to Lyallpur in the north, where the rural weaving industry is again of considerable importance, nine finishing plants are known to be in existence at present. The spinning side of the industry in this region is weak and the supplies of yarn are obtained from outside. With the development of electric power, a development of the spinning mills in rural towns resembling those of the province of Madras is likely to take place to supply yarn to the weaving section. Thus what is now required in these regions is to give a definite shape to the system by organizing the weavers operating power and hand-looms in particular areas into industrial co-operatives and by linking them to a central preparatory finishing and marketing organization established in central towns of such areas.

The fact that an economic organization of cotton, woollen and rayon textile industries is quite possible on a very small

scale, provided electric power is available, has been proved beyond doubt by Japan. The plentitude of electric power in Japan has brought about a new form of industrialization in that country, in which the massing of men in large cities and large factories has given way to a kind of domestic industry dispersed throughout the countryside. The competitive power of the Japanese industry is well known throughout the world and it is really surprising that a majority of its component units are very small. The spinning section is organized on a comparatively larger scale but in the weaving section 94 per cent of the total number of factories, employing about 46 per cent of the total number of workers engaged in the industry, employed less than 10 operatives each. The following table gives a complete picture of the scale of the Japanese cotton industry :

TABLE LVI¹⁵

| Operative per factory | Cotton Spinning | | Cotton Weaving | |
|-----------------------------|---------------------|----------------------------|---------------------|----------------------------|
| | No. of factories | Total No. of operatives | No. of factories | Total No. of operatives |
| 1— 4 | ... | ... | 43,394 | 90,579 |
| 5— 9 | 227 | 1,098 | 2,258 | 14,341 |
| 10— 14 | 17 | 188 | 847 | 8,866 |
| 15— 29 | 16 | 310 | 1,089 | 21,645 |
| 30— 49 | 7 | 279 | 369 | 13,607 |
| 50— 99 | 6 | 407 | 224 | 15,431 |
| 100—199 | 4 | 648 | 119 | 16,668 |
| 200—499 | 33 | 12,743 | 59 | 17,100 |
| 500—999 | 72 | 52,840 | 14 | 9,494 |
| 1,000 & over | 61 | 1,00,287 | 16 | 21,976 |
| | 443 | 1,68,800 | 48,389 | 2,29,707 |

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The rayon and woollen industries of Japan are also organized on a similar model. Nearly 60 per cent of the total production of rayon goods comes from small-scale factories employing less than 30 hands each, and nearly 79 per cent of the total output of woollen goods comes from similar small-scale factories. In all these small-scale factories the family unit is yet playing

¹⁵ Teijiro Vyeda: *The Small Industries of Japan, Their Growth and Development* (1938), p. 53.

the most important rule. But with the introduction of electricity the power-loom has succeeded in pushing the handloom practically out of the picture. The changes in the percentages of power-looms and handlooms in Aichi Prefecture during the ten years from 1923 to 1934, give a clear idea of the revolution that has taken place in Japan in the mechanization of small-scale cottage industries.

TABLE LVII

| Year | Percentage of power-looms | Percentage of handlooms |
|------|---------------------------|-------------------------|
| 1923 | 47 | 53 |
| 1924 | 64 | 36 |
| 1925 | 62 | 38 |
| 1926 | 77 | 23 |
| 1927 | 81 | 19 |
| 1928 | 91 | 9 |
| 1929 | 96 | 4 |
| 1930 | 96 | 4 |
| 1931 | 97 | 3 |
| 1932 | 96 | 4 |
| 1933 | 98 | 2 |
| 1934 | 99 | 1 |

As the want for clothing ranks next to food, so the weaving industry ranks next to agriculture in India in providing employment to the people.

The Handloom Fact Finding Committee thinks that it has an abiding place in the economy of the country and the Government of India have decided to establish an All-India Handloom Board with a view to rehabilitate the industry on a stable basis. The Board will arrange for the apportionment of yarn among different provinces and states and will assist the handloom weavers in obtaining dyes, chemicals and stores at fair rates, in marketing their product and in improving their technique and efficiency. Whatever the government is doing in this direction is all praiseworthy and welcome but if the weaver's craft is to survive as a useful link in the rural industries of the future the weavers must be organized into industrial co-operatives and must be assisted in purchasing power-looms and electric motors in all those regions where the electric current for power is made

available. And the change-over from handloom to power-loom, which is in the best interests of the rural weaver, must be assisted and not resisted.

In some of the regions like Bengal the main obstacle in the path of progress of the rural textile industry is the weakness of the spinning section of the cotton mills, which spins little yarn beyond their own requirements for placing in the yarn market. At present practically the entire demand of the handloom weavers of Bengal is being supplied from Madura and Bombay. The weaving of artificial silk, wool and mixed fabrics is important in the Punjab. But the yarn for these fabrics in the pre-war years was imported from outside, especially from Japan. In both of these provinces—Bengal as well as the Punjab—spinning of yarn requires all the encouragement that can be given to improve the position of the weaving industry.

Besides textile industries, the small-scale metal industries, catering to supply the ordinary small articles of every day use, can also be started in rural areas without much difficulty. The nuclei of some of these industries are already in existence in a large number of towns throughout India. These towns can become the centres of rural areas in their neighbourhood for supplying the raw or partly manufactured materials and for acting as sale depots for finished goods. To take examples from the United Provinces, the manufacture of knives, forks, scissors, cutlery and enamelled ironware can be started in the rural areas lying in the vicinity of towns like Meerut and Hathras where the industry for the production of these articles is already in existence. The manufacture of articles made of brass, copper and other non-ferrous metals can be taken up in the areas represented by the towns of Aligarh, Moradabad or Farrukhabad.

The manufacture of bicycles is a small-scale industry in Japan, where the number of workers in small factories employing less than five hands constitutes 65 per cent of the total. All parts are standardized and every factory produces only one or two parts. For the purpose of producing a somewhat inferior and cheaper article, they have devised such simple machines as can be operated by housewives and children. In 1937-38 out of a total number of 1,70,664 bicycles imported in India from other countries 5,359 came from Japan. At the present time the steel strips required for the manufacture of steel tubes are not made in India but in the post-war period the production of

these strips can be taken up by the steel industry and then these strips can be easily turned into steel tubes by electrical welding. The standardized parts manufactured in rural areas can be assembled in central marketing towns where the painting and gilding of parts can also be done by a different set of craftsmen specializing in that work.

At present, two or three large-scale cycle works are already in existence in India and there is a feeling in some quarters that they can meet the entire demand of the country. But in case the present road-building programme of the government takes a concrete shape in the post-war years and the industrialization of the country also makes further progress, the demand for bicycles in rural and suburban areas might increase manifold. In that case the manufacture of accessories, spokes, tubings, rims, etc. can be entrusted to firms in the rural areas, while the production of some of the special parts like free-wheels, chains and steel balls may be undertaken by central cycle works. This industry may appropriately be taken up by the military department of the government, which is concerned with discovering avenues of employment for demobilized military personnel. Thousands of technically trained young men are now working in the military establishments of the government as fitters, carpenters, blacksmiths, turners, and electricians. These technicians along with intelligent demobilized soldiers may with advantage be engaged in this industry. The capital may be provided from the funds already accumulating for settling demobilized military men.

Rubber tubes and tyres and other small rubber fittings like grips, brakes and pedal rubber can also be made on a small scale in small towns in the rural areas. But this industry requires, besides scientific knowledge, cheap supplies of chemicals, not available at present in India.

The production of glass pearls, buttons and beads can be very easily carried on in the villages of the Mainpuri, Agra and Aligarh districts in the vicinity of towns engaged in glass industry. In the villages around Hathras there are about 50 workshops, which prepare these things. In the same areas the production of fancy, flash light and automobile bulbs can also be carried on on a very small scale. The manufacture of electric bulbs has already been started at Agra and the production of the above-mentioned cheap types of bulbs can with advantage be taken up in the smaller towns in the surrounding region.

Like watch-making in Switzerland and manufacture of musical instruments in Saxony, there are many industries, e.g. the making of umbrellas, furniture, leather goods, clocks, toys, fountain-pens, pencils and spectacle frames, which can be established in rural areas away from the big cities.

Besides these, another important group of industries suitable for rural areas is connected with the processing of agricultural, plantation and farm produce. Rice and flour milling, sugar processing, firing and manufacture of tea, and preparation of cream and butter can all be carried on in small localities with the help of electric power. Such small-scale industries, when they come to be established, will provide the most necessary link between agriculture and large-scale industries and will narrow down the gap between the rural and urban incomes and living conditions by reducing the unduly heavy pressure on land and by providing another source of income to the rural population.

The Famine Inquiry Commission, appointed under Ordinance No. XXVIII of 1944, have suggested in their Final Report, a type of large-scale industrial undertaking—not small-scale cottage industry—which is specially suitable for development in rural areas. They have given the name 'agro-industry' to this type of industrial undertaking. The following passage from the Report of the Commission is worth quoting in this connexion: 'We may illustrate the type we have in mind by a description of the results achieved on an estate (Walchandnagar) in the Bombay Presidency. The estate, which covers about 45 sq. miles, was formed about 12 years ago by the acquisition or lease of land from numerous small holders and has been developed primarily as a sugar farm. Large areas of salt-affected wasteland have been reclaimed; irrigation has been extended; and between 1933-34 and 1942-43, the total area under cultivation increased from 1,400 to 5,600 acres. The area grown with sugar-cane has, during the same period, increased from about 1,000 to 3,500 acres and the yield has gone up from 35 tons to about 53 tons per acre, an increase of 50 per cent. The area under food crops has also increased and recently the cultivation of vegetables on a considerable scale has been developed. Further, a dairy has been started and a pasteurization plant installed. To deal with the sugar-cane grown on the estate, a sugar factory has been established, which is now capable of dealing with 1,200 tons of cane per day. The increasing area of land under sugar-cane

required increasingly large quantities of organic manure. In order to meet this demand an oil mill has been established and the groundnut cake produced by the mill is used on the farm. The groundnut oil extracted in the process had to be marketed satisfactorily. This led to the installation of an oil refinery and an oil hydrogenation plant for treating the raw oil of the mill. This, in turn, led to further developments, such as the manufacture of various types of soap from the waste products of the refinery. The development of the sugar factory likewise led to the establishment of a distillery for the manufacture of rectified spirit from molasses and also for the recovery of yeast. Developments to the mutual benefit of the factory and the farm are not yet exhausted; research and experiments are still proceeding into the best ways of utilizing the products of the factory and the farm and avoiding waste. We understand that the volume of employment has increased, that better wages are being paid than in similar employment in the neighbourhood, and that, in particular, new avenues of employment have been developed for skilled personnel. Housing is provided for a large part of the staff and the amenities provided include free medical and education facilities.¹⁶ In this case the basis of industrial development has been provided by sugar-cane. But oil-seeds can provide an equally sound basis for the development of a widely dispersed agro-industry throughout the country.

The rural industries would create a further demand for capital goods like machine tools and motors and for partly manufactured goods like yarn, steel strips, non-ferrous metals, leather, rubber, glass, etc. The income derived from these industries would further enlarge the consumers' markets of the large-scale industries producing consumption goods such as sugar, cement, steel girders, shoes, textiles, etc. The efficiency of the urban workers might also be increased, as with the improvements in the conditions of living in the rural areas the chances of the standard of living and wages of the city workers being swamped by an excessive flow of labourers from rural areas with a very low standard of living might be reduced and the possibilities of the large-scale, urban industries being able to get new recruits acquainted with modern machinery might be improved. Rural industrialization in a number of countries in Europe has brought about such an intimate relationship

¹⁶ The Famine Inquiry Commission: Final Report (1945), pp. 307-9.

between agriculture and industry that it is at times difficult to draw the line between the spheres of the two. Industry helps in the handling of the produce, supplies the farm with fertilizers, feeding stuffs, machinery and many other subsidiaries and materials. On the other hand, agriculture supplies industry with some of its raw materials. Dairies and milk condensation and powder factories, factories for the preparation of organic therapeutic products, the edible oil industry, milling, canning, chocolate and tobacco industries are all an outcome of the correlation between agriculture and industry in Europe.¹⁷ With a new orientation and co-ordination between agriculture and industry on the one hand and the village and the city on the other, the establishment of a similar harmony of interests between rural and urban areas in India is not difficult of achievement, so that, in the words of Dr Mukerjee, 'the science and technique of the city will utilize the resources and raw materials and replenish the wealth of the village more than it will exhaust and its life will stimulate the minds and enlarge the vision of a far greater number of people than it will warp or repress.'¹⁸

The small and medium-scale industries should occupy a definite place in any scheme of industrial development of the country likely to be adopted in the post-war period. The authors of the Bombay Plan have recognized the importance of small-scale cottage industries not merely as a means of affording employment but also of reducing the need for capital, particularly of external capital in the early stages of post-war industrial development. They think that while in basic industries there is little scope for small industrial units, they have an important and useful place in consumption goods industries where their function in many cases is complementary to that of large units. Some people are doubtful about the ultimate survival of such small industries but Dr P. S. Loka Nathan feels that 'the fear that they will be swamped and ultimately destroyed by modern industry is perhaps groundless. Eighty-five per cent of the million workers employed in industry in 1931 were engaged in small and cottage industries and there is no reason to think that industrialization will seriously alter this proportion.'¹⁹ As an instrument of war production the small-scale rural and urban

17 Mukerjee, *op. cit.*, p. 15.

18 *Ibid.*, p. 15.

19 Loka Nathan, *op. cit.*, p. 30.

industries have shown astonishing flexibility and adaptability to mass production methods. Marshalling skill and resources these small artisans and workshops produced cotton textiles, woollen blankets, leather goods, camouflage nets, helmets, etc. valued at more than Rs. 10 crores a year.²⁰ In the post-war period they can very well adapt themselves to the changed conditions of the post-war civilian demand if they are assisted to organize themselves into industrial co-operatives.

Certain groups of industries suitable for development in rural areas have already been suggested. Any attempt at further cataloguing is not called for, because when detailed plans for the development of different regions are prepared, the scope of rural industries in each region will have to be determined according to its resources and requirements. But the establishment of engineering workshops and chemical industries in different regions of the country to provide the rural workshops with motors, tools and chemicals is an essential preliminary without which no real progress in the direction of rural industrialization can be expected.

²⁰ Mukerjee, *op. cit.*, p. 14.

CHAPTER XIV

THE NEED FOR PLANNED REDISTRIBUTION OF INDUSTRY IN POST-WAR ECONOMY

Division of labour is based on 'varying ability and advantages of specialization'. The adaptation of tasks to varying aptitudes is conducive to greater efficiency. Similarly, the adaptation of occupations and industries to resources is a cause of regional division of production. Each region is best equipped to produce the goods which require large proportions of factors relatively abundant there. Consequently the industries gravitate towards regions where the major proportion of factors of production are cheap and abundant. One region, like the Chota Nagpur Plateau (along with parts of South Bihar, Western Bengal, Orissa and the states of the Eastern India Agency) may possess coal and other minerals but the land surface may be unsuitable for efficient farming, while another region like the Punjab may possess very fertile soil but may be entirely lacking in mineral resources. Evidently the first region is better equipped for mining and metallurgical industries and the second seems destined to become an agricultural region. And actually we find that mining and metallurgy is the primary industry of the first region and agriculture is only secondary. The brick and metal industries (near Asansol and Kumardhubi), coal, mica, bauxite, iron, manganese, chrome, copper, dolomite, limestone and clay mines, cement (Dalmia group), iron and steel and allied industries (Jamshepur group) are all concentrated in this region. Such industries are conspicuous by their absence in the Punjab where the land is mainly devoted to the production of wheat and cotton. As discussed in the earlier chapters, it is mainly owing to such variations in the equipment of industrial resources of different regions that cotton, jute, wool, sugar and leather industries have established themselves predominantly in Western India (especially the province of Bombay), the Hooghly riverain, North-Western India (from Cawnpore to Srinagar), North Bihar and the U. P., and Southern India respectively.

Most of these industries are, however, not well distributed in their respective regions, but on account of the advantages of industrial concentration are huddled into certain important cities

like Bombay, Ahmedabad, Nagpur, Cawnpore, Calcutta, Jamshedpur and Madras, which generally happened to enjoy specially favourable transport facilities in the early period of the growth of these industries. There is nothing unusual about the heavy concentration of these industries, as whatever the industry, once established in a region, it creates conditions favourable to its growth; concentration brings advantages and fosters the growth of large cities. These cities, in their turn, offer advantages to other industries and thus the chosen district grows like a snowball. As an illustration of this tendency, the growth of population in a set of important industrial towns of India may be compared with that of another set of non-industrial towns.

TABLE LVIII

| Industrial towns | Percentage increase in population | | Non-industrial towns | Percentage increase in population | |
|----------------------------|-----------------------------------|-----------------------|----------------------|-----------------------------------|-----------------------|
| | Between 1891 and 1941 | Between 1931 and 1941 | | Between 1891 and 1941 | Between 1931 and 1941 |
| Calcutta (with Howrah) ... | 189 | 79 | Lucknow | 46 | 39 |
| Bombay ... | 81 | 28 | Agra | 74 | 23 |
| Karachi ... | 266 | 36 | Benares | 18 | 28 |
| Ahmedabad ... | 310 | 97 | Allahabad | 49 | 41 |
| Cawnpore ... | 151 | 99 | Patna | 7 | 48 |
| Amritsar ... | 185 | 48 | Jaipur | 7 | 22 |
| Nagpur ... | 158 | 45 | | | |
| Madura ... | 175 | 31 | | | |
| Sholapur ... | 244 | 47 | | | |
| Coimbatore ... | 183 | 37 | | | |
| Jamshedpur * ... | 2,383 | 78 | | | |

Note—The general trend of the increase of population in India is at the rate of 11 to 15 per cent a decade.

* It is an entirely new town. Its population in 1911 was only 5,672 but in 1941 it rose to 1,48,711.

During the fifty years from 1891 to 1941 most of the industrial towns included in the above list have shown a phenomenal increase in their population. Leaving aside Jamshedpur the rate of increase of population of these towns (with the exception of Bombay, where further growth has been held in check for want

of land) ranges from 151 per cent in the case of Cawnpore to 310 per cent in Ahmedabad. The populations of Cawnpore and Ahmedabad have practically doubled in a brief period of ten years between 1931 and 1941. During the same period the populations of Calcutta and Jamshedpur have increased by 79 and 78 per cent respectively.

The relative stagnation of non-industrial towns, like Patna and Benares, where the rate of growth during the same period of 50 years ranges from 7 to 74 per cent only, marks a strong contrast and proves that the abnormal growth of most of the modern industrial towns is directly correlated to the concentration of industries in these cities.

Since 1918, some of the older industries, like the cotton textiles, have been moving away from the coastal port towns to the new centres in the interior; this movement, however, has not relieved the heavy congestion of population in the older centres, as the transfer of older industries has been more than offset by an accelerated development of new industries at the ports and other financial and industrial centres. Thus in spite of the decentralization and dispersion of older industries after the First World War even the general regional pattern of industrial concentration has remained practically unchanged. With the exception of iron and steel industry at Jamshedpur and the sugar industry in North Bihar and the U. P.—the industries which are raw-material-localized—most of the other new industries have come to be established in older industrial regions and centres. The position of industrial concentration today, with a few changes, is the same as it was half a century earlier. The provinces of Bengal and Bombay continue to have a predominant share of the country's industrialization and development today as they did fifty years or more earlier.¹ The names of about half a dozen towns like Bombay, Calcutta (with adjoining industrial districts), Ahmedabad, Cawnpore, Nagpur, Jamshedpur and Madras almost exhaust the list of important industrial centres of India today as they did earlier. The only new towns that are gaining in population and industries and are emerging in new

¹ The provinces of Bengal and Bombay with 15 and 5 per cent of the total population of India respectively contained 29 and 23 per cent of the total number of industrial workers in 1939, while the U. P., Madras and Bihar with 14, 13 and 9 per cent of the population respectively contained 8, 10 and 5 per cent industrial workers respectively.

regions are Coimbatore, Dehri-on-Sone (in Bihar) and probably Beghamabad (near Meerut). On the whole the general trend even up to the last census of 1941 was definitely towards concentration of population and industry in older centres.

The attention of thinking people has been drawn forcibly towards the disquieting consequences and dangers of the policy of drift towards this unhealthy concentration and unplanned location of industries by the exigencies of World War II. India was caught quite unprepared and napping. Her industrial structure was weak, inelastic and dependent on foreign supplies for most of the vital and essential requirements of modern industries such as plant, machinery, tools and stores. Besides this most of her excess capacity in almost every industry lay in a few large and already overcrowded cities mentioned above, so that a major portion of the industrial production to meet the war demands came to be located in these overcrowded centres.

The population employed in organized industry in 1938 was 17.5 lakhs. Owing to the urgency of war demand the figure rose to 21.6 lakhs in 1941, registering an increase of nearly 25 per cent in a brief period of three years. The increase in 1944, according to official computations, as compared with 1938 (the year immediately preceding the war) would be of the order of 50 per cent.² These figures do not include large numbers actually working in village industries, small businesses or various works employing unskilled labour. These additional workers, along with the personnel of other subsidiary establishments connected with the war production and supplies, further aggravated the existing uneven distribution of population by adding millions of people all of a sudden to the population of overcrowded industrial cities without giving any time or chance to the supply and distributing agencies to adjust themselves to the changed conditions. The depleted and curtailed transport services, mainly engaged in war transport, proved unequal to the heavy task imposed upon them and were strained to the breaking point.

On account of the new changes the population of big cities like Calcutta and Bombay (with more than 10 lakh people each) rose within three years (from the time of the last census of 1941 to the first quarter of 1944) by more than 88 per cent. The

2 Reconstruction Committee of Council: Second Report on Reconstruction Planning (1944), p. 7. • •

population of Calcutta at the beginning of 1944 was about 31.41 lakhs as compared with 24.88 lakhs in 1941, and of Bombay 25.19 lakhs as compared with 14.89 lakhs. The population of towns like Ahmedabad and Cawnpore, ranging from 4 lakhs to 10 lakhs each, increased by 44.4 per cent on an average during the same period of three years.

So far as the development of new industries during the war is concerned, it is the considered opinion of eminent persons like Dr John Matthai, that this war has retarded rather than helped such development in India. In most cases only the production of existing industries in older centres has been increased. For example, the production of army boots, and harness and saddlery has been increased ten to twelve times their original figures but the production has remained confined mostly to old centres.

Some of the new industries making paints and varnishes, a number of chemicals, clothing, bodies of vehicles, parachutes, and a number of miscellaneous articles have all come to be located in old centres like Bombay, Calcutta and Cawnpore. The location of paint and varnish factories may be taken as an illustration. Of the 62 factories, 56 were located in the neighbourhoods of Bombay (28), Calcutta (22), and Karachi (6). Thus most of these new war industries, have only accentuated rather than counterbalanced the general trend towards industrial concentration in a restricted number of industrial centres and regions.

This industrial concentration aggravated by war conditions, as already explained, has resulted in awful housing conditions in most big cities and towns. Of the total population of Bombay 74 per cent live in one room tenements; in some areas of Bombay there is an incredible average of 15 persons to a room. Even in some of the upcountry towns, like Cawnpore, not handicapped like Bombay for want of land, 66 per cent of the total population live in one room tenements. A fairly large number of people in big industrial cities has been actually reduced to the status of street-dwellers. This condition creates difficult problems regarding the health and hygiene of these cities.³

³ Mr M. N. Modak, City Engineer, Bombay, addressing a meeting of retired Parsi officers on December 7, 1944, said: 'Nearly 2,00,000 people in Bombay live on the pavements and foot-paths and the shortage of housing in the city is very acute. Refuge has increased by several hundred tons; and there was a strain on every utility service. It is only Providence that has saved us from an epidemic.' • •

Poverty and disease are rampant in most of these industrial towns. The following figures of mortality rates show the evil effects of excessive congestion on the health of the nation:

TABLE LIX

| Province | Town | Period | Mortality rates | | Infant mortality per 1,000 live births | |
|----------|-----------|---------|----------------------|---|--|---|
| | | | Average for the town | Average for the urban areas of the province | Average for the town | Average for the urban areas of the province |
| Bengal | Calcutta | 1935-37 | 31 } | 22 | 245 } | 188 |
| | Howrah | 1935-37 | 39 } | | 271 | |
| Bombay | Bombay | 1937-39 | 28 } | 30 | 242 } | 210 |
| | Ahmedabad | 1937-39 | 47 } | | 277 | |
| | Sholapur | 1937-39 | 40 | | 210 | |
| Madras | Madras | 1935-37 | 39 | 24 | 223 | 290 |
| U. P. | Cawnpore | 1938-39 | 37 | 29 | 312* | 198* |
| C. P. | Nagpur | 1937-39 | 46 | 33 | 240 | 222 |

* The figures relate to 1938-40.

The average mortality rate in Howrah was 39 per thousand of population as compared with 22 for the urban areas of Bengal and that for Ahmedabad was 47 as compared with 30 of the urban areas of the Province of Bombay. As regards the infant mortality Howrah registered 271 and Ahmedabad 277 per thousand live births as compared with the average of 188 and 210 for the urban areas of the two respective provinces.

These figures show that in spite of the existence of far superior social, maternity and health services in the cities in comparison with the rural areas of India, a higher death rate prevails in the cities as compared with the country. This is undoubtedly due to smoke, noise, overcrowding and the presence of poverty which in cities appears to be an aggravated evil.

Besides this, there are other equally serious disadvantages of excessive concentration. The long daily journeys which the work people have to undergo involve a reduction in their real income both on account of the waste of time and energy and the high travelling cost. These in turn affect efficiency and output. The increase in land values which results from concentration places a heavy burden on the industry and local authorities; makes rebuilding more expensive and thereby increase the difficulties of town planning. If an estimate could be made of the total cost to society of the waste of time resulting from traffic congestion and of the damage to public health and loss of efficiency caused by overcrowding, smoke and noise, it would run into crores of rupees per year. During the last fifty years, the towns have played a very great part in the diffusion of modern culture in the countryside, but the very channel through which such diffusion takes place can also spread the ill-health. The consequences of excessive congestion in the industrial areas are, therefore, not confined to such areas but spread to agricultural areas as well and thus affect the well-being of the entire nation.⁴

The herding of millions of people under unhealthy and insanitary living conditions is only one of the phases of industrial concentration in a few centres. The Second World War glaringly exposed yet another serious and disastrous defect of faulty and unplanned industrial localization in this country. The inflationary method of war finance in India has brought about a general fall in the real income everywhere. But this fall has been offset, and more than offset in regions and centres where industries are concentrated, on account of the creation of a vast volume of additional employment by the requirements of war production and consequent competition for labour. On the contrary in the densely populated non-industrial regions the increase in employment has fallen short of the financial contribution, direct or indirect, to the war finance and in consequence the money wages have also fallen short of the inflated higher commodity prices. The income of the rural worker has proved insufficient and the rural economy in agricultural regions like east Bengal, north Bihar, part of Orissa, and Madras (particularly Travancore) has broken down under the heavy burden of a modern war. And disease and vices in the centres of industrial congestion and the

⁴ *Location of Industry in India*, p. 12. (Based on the observations of the Barlow Commission Report, pp. 86-7.)

ravages of starvation and famine (as in Bengal) and mal-nutrition and epidemics (as in north Bihar) in non-industrial regions have been partly the inevitable consequences of the unplanned industrial growth and uneven distribution of industries in different regions of this country.

This deplorable state of affairs loudly calls for a remedy in the form of planned location of the new industries of the future, a redistribution of the existing industries as far as possible and, a decentralized system of production, with a view to 'remove the present contrast between a few great cities of wealth and surplus and thousands of poverty-stricken, deficit villages'.⁵ That such re-location and decentralization is quite possible has been proved beyond doubt by Soviet Russia. The planning and re-location of industry nearer to sources of raw materials and power supply were all a part of her pre-war policy and have proved to be invaluable assets during the German invasion. All types of industries were moved not only beyond the Urals but were taken to some of the interiormost regions like the republics of Central Asia. It was mostly the production of these industries which kept the Russian armies in the field unbeaten, even when most of the industrially important part of European Russia was run over by the advancing German forces.

Besides this, the strategical danger to cities like London or Calcutta, the wholesale evacuations and the mobility of workers during the war time have made us realize that gigantic cities and pre-war distribution of population between rural and urban areas and industrial and non-industrial regions are not the results of forces outside the control of man.

Since the beginning of the war, the location of industries and other allied problems have been thoroughly examined by a number of commissions and committees in England with a view to formulating and determining a suitable post-war policy. In the opinion of the Royal Commission on the Distribution of Industrial Population, the 'disadvantages in many, if not in most of the great industrial concentrations, alike on the strategical, the social and on the economic side do constitute serious handicaps and even in some respects dangers to the national life and development.' The Commission recommended 'that definite action should be taken by the Government towards re-modelling them.'

⁵ R. K. Mukerjee: *Man and His Habitation* (1940), p. 295.

The problems created by industrial concentration in India are in no way less serious. The hygienic and social disadvantages due to smoke, noise and overcrowding exist in our industrial centres in their worst form. From the strategical point of view a heavy aerial blow aimed against Calcutta and Bombay by an enemy power can paralyse the whole of our national life in no time. From this point of view the location of a major portion of our iron and allied industries at and near Jamshedpur and Asansol is also very dangerous.

Besides these social, economic and strategic factors, there are certain other equally important considerations which make the planned re-distribution of industries imperative for India. Most important of these considerations is the existence of a huge plan of the post-war development of the means of transport—especially the roads and the railways. Four hundred thousand miles of new roads and 5,000 miles of new railways are expected to be built up. Some development of minor ports, coastal shipping, air and inland water transport is also likely. This new development offers a very good opportunity to India for facilitating the redistribution of her industries, because the transport relations constitute a major factor in determining the location of industries. And, therefore, a well planned and co-ordinated programme of new construction can be very effectively used for bringing about the necessary alterations and changes in the existing structure of the means of communication with a view to providing better and improved transport facilities to many a new point in most of the industrially backward regions and thereby minimizing the undue importance of a restricted group of old industrial centres in the coastal regions as well as in the interior.

Means of transport and freight policies of the transport agencies have been mainly responsible for the congestion of industries in and around Calcutta and Bombay—the two main ports of India—and, therefore, suitable modifications in the existing structure of transport system and the freight policies are most likely to produce the necessary changes in the locational trends of the industries for bringing about a more balanced regional distribution of industries.

Another important incentive for a planned re-distribution and location of industries in the post-war period is provided by the schemes of post-war electric development in various regions

of India. 'The policy of the Government is to secure the development of electric power on a regional basis to promote the maximum economic development and utilization of such power, and to eradicate such factors in the present system as retard the growth of such development.' In Soviet Russia the industrial development was greatly assisted by projects, carried out on a huge scale, similar to those in the U. S. A., for rural electrification, irrigation and water supply. The great dam at Dniepropetrovsk, by far the largest in Europe (blown out by the retreating Russians to prevent its use by the Germans), was built to improve navigation on the river Dnieper, and was to be the main source of energy for a vast new industrial region in the Ukraine, which was mainly agricultural. In India also the development of electric power can give rise to new large-scale electro-chemical industries, such as those producing fertilizers and rayon yarn, and electro-metallurgical industries such as those producing aluminium and ferro-manganese. Besides it will bring about important changes in the existing regional distribution and location of cotton and other textile industries.

To secure these ends the schemes of electric development should be correlated to the schemes of industrial development at this stage. It may not be within our power to locate the sites of electric generation exactly according to our industrial requirements, but we can very profitably plan the network of electric transmission lines to suit our industrial schemes. For alterations in such network become difficult and costly later on.

The next important consideration is the possibility of the establishment of certain basic industries in the post-war period. The absence of basic industries manufacturing capital goods, chemicals and stores has also been responsible, partly, for the congestion of light industries in the port towns on account of the dependence of the country for such supplies from abroad. In the post-war period there is a great likelihood of the establishment of mining and metallurgical industries in aluminium, manganese, etc.; engineering industries for the fabrication of machinery of all kinds, machine tools, and for the building of locomotives, electric motors, ships, automobiles and aircraft; and chemical industries for preparing heavy chemicals, fertilizers, dyes, plastics, mill stores, etc. Some companies in all these branches are already in the field. Companies for working aluminium have been started in Travancore and at Asansol and for

textile machinery at Gwalior and Belghoria (Bengal). The assembling of aircraft has been taken up in Mysore and shipbuilding yards have been established at Vizagapatam. A certain firm in the Punjab has, at the suggestion of the Government, placed orders in the U. S. A. for electric motor manufacturing machinery; the buildings to house this machinery, which has not been received as yet, are ready. Two or three companies have also been registered for the manufacture of automobiles. There is no definite plan for the location of these projected industries and, therefore, such development cannot help the country to base its industrial structure on a sound and rational foundation, as a well-planned location of basic industries is essential for an even distribution of light consumers' goods industries.

The question of stabilization of a number of types of industries created or expanded during the war will also require immediate attention in the post-war period. A large number of small industries have sprung up, working on raw materials supplied by the Government, to roll bars and sheets of non-ferrous metals, to make and cast brasses and bronzes of various specifications required for munition purposes, to make solders, bearing metal, gun-metal, white metal, etc. Besides such private-owned factories and workshops, there is a very large number of government-owned munition, food, clothing and other factories. These industries have grown and multiplied without any plan or rationalization in response to war demand. A fairly large number of such units, like the vegetable dehydration plants, are wrongly located from the point of view of supplies of raw materials, and the goods produced by a number of other types of units, such as the meat dehydration plants and clothing factories, may not be in demand any longer after the cessation of hostilities.

For a country like India, poor in industrial development, such properties are very valuable. The tax payers' money has been invested in them and as such they are assets of the nation. With slight alterations and modifications in equipment and after necessary changes in the location of the units, a majority of them can be converted for the production of machine tools, radio sets, scientific instruments, aircraft parts, etc. for the needs of civilian industries and for the manufacture of specialized equipment required by the State Railways and the Post and Telegraph Departments. The manufacture of such things is a distinct

possibility in India. Certain types of telegraph poles, which were imported in the pre-war days, have now been replaced by what are known as 'Hamilton Poles' made by indigenous manufacturers from indigenous steel. A part of the munition factories which may not be required for the manufacture of such peace time goods may be retained to supply the needs of our peace time defence forces so as to make us independent of England for such supplies.

All these problems and plans require careful co-ordination if they are to yield the desired results. India is just about to complete the first century of her industrialization and the potentialities of the future are so vast that the cessation of hostilities may really inaugurate a new era of industrial prosperity only if we could make the best use of the opportunities offered to us for the development of new industries and reorganization and rehabilitation of the existing ones. The vast plans for the construction of new roads and railways, important new schemes for the establishment of a number of basic and light consumers' goods industries, the possibilities of conversion of a large number of private and government-owned war factories for civilian production, bright prospects of power development, and opportunities of re-equipping older industries with up-to-date machinery and rural industrialization—all taken together and welded in a harmonious whole by careful planning in advance—can make India really industrially great and strong. But if we fail to plan now for reorganization and redistribution of industries on a regional basis, the evils of industrial concentration in particular regions and centres are likely to be further aggravated. And if government does not check this in time new industries would continue to be established in the neighbourhood of great industrial towns and cities resulting in further ribbon development of such localities, resulting in the worst forms of chaos and squalor.

Public opinion in most of the leading industrial countries is definitely against industrial concentration in certain regions and big centres on account of social, economic and strategical dangers involved in such development. People responsible for post-war planning favour a decentralized type of industrial structure based on a regional distribution of industries. The following extract from *Target for Tomorrow*, No. II gives an idea of the trend of thought regarding the post-war industrial development in England.

'To secure the best national uses of the resources of the country the Government should control the geographical distribution of population and industries, to give a more balanced distribution of population and industries. The best way of bringing this about was to secure for every region or area a variety of industry and employment, as a safeguard against chronic depressions. Industry and population should be dispersed from the most crowded areas and the worst towns and cities should be remodelled in order to loosen up the central areas of congestion and to create a more decentralized... type... New industries should only be encouraged to settle where there are suitable markets, labour, transport and power and proper social conditions for the workers.'⁶

A reference to electric power as a decentralizing agency has already been made in Chapter XIII, dealing with the prospects of rural industrialization. Under modern conditions, an electric power plant may perhaps have to be gigantic in order to increase the operating efficiency or to take advantage of a big head of water; but by means of long-distance interconnecting transmission systems or grids, the power itself may be produced in many centres and made available over a wide area, with a balanced load and little idle plant. Power production no longer requires local concentration, either within the plant or within the manufacturing area. But it is not the power alone that has brought with it the possibility of a new industrial and therefore an essentially different urban structure. The modern road transport also helps in the process. The motor car, the motor bus and the motor truck have decentralized transportation as radically as the transformer and the motor have decentralized the application of electric energy. An individual unit can start or stop, take the high road or the branch road, at its convenience without waiting for other cars. It can penetrate the hinterland in a more effective and economic way than the railroad could. The motor car can also climb steep gradients and penetrate hilly country with a freedom unknown to the railroad; and it makes an effective connecting link with the air plane—the latest means of fast cross-country transportation. The motor car has potentially opened up new frontiers of human settlement. For the uplands, which motors reach so easily, are the

⁶ Flora Stephenson and Phoebe Pool: *Target for Tomorrow*, No. II, p. 32, 1944.

seat of the fast-running, young rivers and waterfalls, the new sources of power; and by means of the motor car, and hydro-electric plants areas that have hitherto been remote and uncultivated can now support well balanced industrial communities. With these new means of transportation and power generation, special local advantages, once concentrated in a circumscribed centre, a nodal point in the transport system, can be distributed throughout a whole region. To complete this, the telegraph, the telephone, the radio, the teleprinter, and television apparatus have likewise come as additional decentralizing forces. Plants or offices that are hundreds of miles apart today may be in closer effective communication than when they were only a few miles apart a hundred years ago. The effect of all these mechanical developments is to enlarge the sphere of activity at the same time that they diminish the need for physical movement and closer settlement. These developments are bound, ultimately, to break up the concentration of industry and population in crowded areas, towns and cities.

The Reconstruction Committee of Council of the Government of India also realize that the post-war problems of the Indian industry as regards location and distribution are nearly similar to those suggested in the foregoing extract from *Target for Tomorrow*. They admit that the 'industrial development cannot proceed according to artificial governmental boundaries; it must depend upon the geography of raw material, power and markets.' 'Planning,' they further observe, 'will therefore have to be regional to a certain extent and the recommendations of the provincial and state authorities will have to be co-ordinated with the practical advice of the industry.'⁷ Regarding the location of new industries in the post-war period they remark: 'The location of industry must primarily depend on convenient access to power, raw materials, transport facilities and markets, but subject to this condition, industry should, wherever possible, be located in rural areas or small towns where expansion is easy and labour can be obtained in close proximity to its village of origin. The creation of large industrial population divorced from its village of origin and living in squalor in large cities is at all costs to be avoided.'

⁷ Reconstruction Committee of Council: Second Report on Reconstruction Planning, p. 27.

Industrial development must not be confined mainly to a few provinces and states but so far as conditions permit should be extended in a rational manner over the whole of India. Particular attention shall be given to those parts of India which are industrially undeveloped and every assistance given towards the establishment of industries in such areas. Industries depending on agricultural raw materials must be linked up with agriculture and their location decided after due consideration of the availability of raw materials, facilities for transport, availability of power and the proximity of the market.

Perhaps the most important matter affecting urban development is the improvement of the conditions of labour. If the worst features of industrialization in Europe are to be avoided in India radical measures will be necessary. This is not only necessary for the welfare of the workers themselves but no superstructure of efficient industrial development can be built upon unorganized, inefficient, underpaid and unhealthy labour.⁸

To achieve the objectives outlined above it is very essential that the future schemes of means of transport and power development should be devised and executed in a manner calculated to create conditions favourable for the diversion of the industries to new points in comparatively less developed or undeveloped regions. The industrial localization in a particular region or country at a particular period is closely related to the stage of economic development reached at the time. Later on changes in transport relations, sources of power, and in mechanical appliances and technical processes may bring about changes in the localization regarded earlier as natural. And, indeed, it is more surprising that industries move about as they do in spite of all deterrent elements, than that they tend to remain for some time where they have developed.

The movement of cotton industry, on account of the application of certain mechanical appliances, from India to England and then to the U. S. A., India (again), Japan and China is well-known; the changes in transport relations have been mainly responsible for the shifting of the location of textile and other industries from the coastal regions of India and the U. S. A. to the regions of the interior; the changes in the form of power used—from water to steam—caused the movement of manufacturing

⁸ Reconstruction Committee of Council: Second Report on Reconstruction Planning, p. 5.

industries from the riversides to the coal-fields; fuel has been the main dynamo that moved the iron industry, as from England to the forests of Germany for charcoal and back to England for coke; from the forests of New Jersey, Carolina and Maryland to the anthracite of the Schuylkill Valley and thence to the upper Ohio basin for Connellsville coke; and finally it has been the electric power that has come as the main decentralization force all over the world. Until half a century ago, the people of Europe, and America depended for tanning almost entirely upon the bark of oak in southern and hemlock in northern regions and consequently the tanning industries were located in the neighbourhood of such forests. In India till recently the tanners depended upon local babul and avaram bark and, therefore, the tanning industry was mostly localized in Cawnpore, Mysore and Madras. But the development of tanning extracts and the chrome process have come as decentralizing agencies.

It will be clear from the examples given above that the movement of industries from one locality to another or from one region to another has always been taking place according to changes in the various factors governing their location, especially the transport relations and the sources of power. And accordingly a redistribution of industries in various regions of India, within certain limits, is perfectly possible if we succeed in bringing about the necessary changes in the means of transport of the country and in the sources of power through the agency of post-war reconstruction schemes, because of the fact that most of the raw materials are widely scattered in this country and there is no dearth of labour supply in any region.

In an industrially less developed country like India the problem of redistribution is much easier than in a fully developed country like England, which has almost reached the limit of industrial expansion, and where the question of redistribution or re-localization raises the difficult problems of industrial de-localization and transference. With us in India where there is yet ample scope for further increase in the strength of practically every industry, the problem of redistribution of existing industries on a regional basis will (as suggested in earlier chapters on various industries) take merely the form of regional specialization, so that the older centres will devote themselves mainly to the preparation of the finer types of goods for wider inter-regional or sometimes international markets—the kind of work

for which they are best equipped on account of the development of specialized and technical labour in such centres. And the new centres of the future to be established in new and undeveloped regions will take up the production of ordinary goods of average quality for distribution in limited regional markets.

The movement for a better regional distribution may be influenced largely by the indirect method of helping the industrial development of backward regions. Direct state intervention may be required only to prevent the maintenance of *status quo* or a further deterioration of the conditions in the older centres with an excessive concentration of industry and population, by controlling the location of new industries in such large industrial cities and towns, as the older industries get dispersed to new centres; so that the history of industrial concentration in coastal regions around Calcutta and at Bombay during the inter-war years may not be repeated in the new era of post-war industrial development.

In countries like Soviet Russia, the location of industries and town and country planning are natural adjuncts to planned economy. Public ownership of all land and major industries makes it possible to plan for the best interests of the whole community. But in a competitive economy of private enterprise there are numerous difficulties in the way of such planning. In spite of the fact that industries and other similar undertakings are not an end in themselves but merely a means to achieve the ultimate aim of national well-being, the private money costs constitute the main basis of consideration in deciding the location of individual units of industry by individual entrepreneurs.

In considering such private money costs and risks, certain social costs of industrial concentration are entirely lost sight of. The social considerations of well-being and full employment of the national labour force are of little direct concern to the entrepreneur and, therefore, the forces of concentration measured in terms of lower money costs are constantly scoring against the forces of decentralization represented by benefits measurable only in terms of the social well-being of the nation. In such a contest, unless assisted by the State, the forces of decentralization are likely to be defeated by the opposite tendencies of industrial concentration.

The State can assist the process of decentralization by improving the means of transport in undeveloped regions, offering

electric power at concessional rates from state-owned electric systems, charging cheap freights on state railways, providing free training facilities to industrial workers and sometimes even by granting to the industries to be located in undeveloped regions direct financial subsidies in the form of partial contributions towards rent, rates, and income-tax in the early stages.

In Soviet Russia the Five-Year Plans of industrial development were so constructed that there was a shifting of industrial capital in favour of undeveloped regions. The young industries of these regions were favoured more so as to show a higher tempo of development than the industries of older regions. As a result of this policy thriving industrial centres grew up in the heart of agricultural regions, where formerly there were only small industries chiefly engaged in the manufacture of agricultural necessities. In the northern part of Ukraine the production of beet and the sugar industry were concentrated and cotton mills were established in Central Asia and Trans-Caucasia. Cotton mills, silk and woollen factories, cotton cleaning plants, and the plants for the production of chemical fertilizers—all sought to extend general economic development and industrialization in regions devoted exclusively to the production of cereals and raw materials.⁹

The State can also create new centres in such regions by locating government- and semi-government-owned industrial enterprises such as munition works, locomotive, aircraft and aero-engine factories in suitable places. In course of time these new centres with lower land values, rents and wages will attract private-owned industries.

In these matters of creating favourable conditions in the backward regions for new industrial development India may, to a certain extent, be guided by the measures adopted in other countries to achieve similar objects. In Great Britain the Special Areas commissioners are empowered, under the Special Areas (Development and Improvement) Act, 1934, to establish Trading Estate Companies with a view to relieving unemployment in the areas and to give them the necessary financial assistance. Similarly under the Special Areas (Agreement) Act, 1936, a limited company was set up to give loans to persons either newly setting up a business in a Special Area or already carrying

⁹ Mukerjee and Dey: *Economic Problems of Modern India*, Vol. II (1941); *A Preface to Planning*, p. XXI.

on a business there and requiring financial help for the purpose of extension. The Commissioners are also authorized to let out factories in the Special Areas under certain conditions and to contribute towards the payment of rent, rates and income tax. In recent years munition factories and foreigners desiring to start undertakings in Great Britain have been directed or encouraged to choose sites in the neighbourhood of particularly depressed areas.

In the U. S. A. the Tennessee Valley Authority has done a great deal of valuable work in stimulating the agricultural and industrial development of the area under its jurisdiction. The Tennessee Valley embraces an area of some 40,000 sq. miles in seven states—Tennessee, Kentucky, Alabama, Mississippi, Virginia, North Carolina and Georgia—and constitutes a natural region which presented a tempting challenge to long-range economic and social planning. Before the constitution of T. V. A., the valley had been one of the most backward and poverty stricken regions in the United States. The Muscle Shoals Act of May 18, 1933, created the T. V. A. with power to acquire, construct and operate dams in the Tennessee Valley, manufacture and distribute nitrate and fertilizers, generate and sell electric power, particularly with a view to rural electrification, inaugurate flood control through reforestation, withdraw marginal lands from cultivation, develop the Tennessee river for navigation, and advance the economic and social well-being of the two million people living in the river basin. The T. V. A. proceeded rapidly with the construction of a series of dams, reduce the electric rates, and campaigned to extend the use of electric appliances. By 1940, the inhabitants of the Tennessee Valley were using 1,179 kilowatt hours of energy per person per year, as contrasted with a national average of 850, and were paying 2.14 cents per kilowatt hour as contrasted with a national average of 4.21. The T. V. A. combined soil conservation with other purposes. Now everywhere the valley is a region of beautiful landscapes, healthy climate, fertile soil, with abundant supplies of raw materials that support its present industries. The ~~valley~~ seems to be plainly destined for a continued growth in manufacture, which will dot it from end to end with a succession of small cities. These cities will have the great advantage of not becoming metropolises in size, and for that reason will have better opportunities to get food, raw materials and space to live.

This increasing city population in many units will intensify agriculture by providing a home market.

Under the Industrial Act of 1936, municipalities and counties in Mississippi are authorized to issue bonds for the construction of buildings to be used for industrial purposes and to own

and operate manufacturing plants or to sell or lease them to private concerns for operation. Such leases usually require payment of nominal rent to the local authority and a guarantee of minimum annual pay roll by the private company. In pre-war Italy, under the Fascist government, the



industrial development of certain selected areas was speeded up by encouraging the setting up of factories by such measures as reduced taxation, duty free import of foreign machinery and materials, preferential freight charges and other benefits for a specified number of years. In France grants were made out of funds especially created for the purpose, towards the expenses of decentralization of aircraft industry.

For preventing further concentration and assisting regional distribution and decentralization of industry in the post-war period, the setting up of a Central Planning Authority is being advocated in countries like England. With regard to state control of location in India the Reconstruction Committee of the Council of the Government of India observe that 'the imposition of controls will require legislation with special reference to licensing of industries, control of imports of capital goods and a control of capital issues.'¹⁰ No further reference regarding the establishment of any authority for regulating the location of new industries has been made in their report.

Dr R. Balkrishna, in his pamphlet, *The Finance and Structure of Industry*, however, suggests the setting up of a permanent body of experts during the post-war period for undertaking

¹⁰ The Reconstruction Committee of Council: Second Report on Reconstruction Planning, p. 26. A later statement of Government's Industrial policy, however, lays down that the 'Government have come to the conclusion that they must take power to license industrial undertakings.'—Statement of Government's Industrial Policy, April, 1945, p. 67.

detailed investigations of the locational dynamics of all the industries of India. 'This body', he writes, 'should examine each industry in terms of transport orientation, labour orientation, and advantages of agglomeration.... and point out unscientific locations.' He also advocates the setting up of a Licensing Authority. He writes: 'So as to secure a better regional distribution and also to guide industrialists, a Licensing Authority should be constituted with power to grant and with-hold licenses to set up factories, subject to an appeal to a higher tribunal.'¹¹

To be really useful, the authority to be constituted to guide the post-war location and regional distribution of industries should perform both the functions suggested above. The power of issuing or withholding licenses represents only the negative side of the requisite machinery to regulate the location and distribution of new industries. Its functions on the positive side should be to undertake a thorough survey of the industrial resources of the country, to prepare and co-ordinate the plans for the post-war development of industries (including agriculture), communications and power, and to provide a balanced economy based on a regional system of distribution of industries so as to raise the standard of living of the people throughout India, as envisaged by the National Planning Committee set up by the Indian National Congress. The Central Planning and Licensing Authority to be competent to perform these functions should consist of the representatives of industrialists, the organized labour and the Government, and a few intellectuals.

In countries like England, where the government is responsible to the people and where the interests of the government and the people are the same, there is no apparent difficulty in setting up such an authority. But in a country like India, which is divided between the Indian states and the British territory where the development of industries is, according to the present constitution, a provincial subject,¹² where the government of the

11 P. S. Loka Nath : *Industrialization*, p. 29.

12 In a statement of Government's industrial policy issued by the Planning and Development Department of the Government of India on April 21, 1945, the Government declare themselves in favour of taking under Central control some twenty key industries like iron and steel, automobiles, aircraft, ship-building, machinery and machine tools, heavy chemicals, cotton and woollen textiles, cement, sugar, rubber, non-ferrous metals, electric power, coal and radio-engineering. Some of these industries of natural importance may also be nationalized if adequate private capital is not coming forth for their development.

country is not responsible to the people, and where, consequently, the interests of the government and the people are not identical, there are obvious difficulties and dangers in creating such an authority. There are many possibilities of the power of withholding licenses being abused to restrict the industrial progress of the country at the instance of internal or external vested interests.¹³

Such an authority as contemplated above, however, can only be set up by a truly National Government, which enjoys the confidence of, and is responsible to the people of India. It is only an authority so constituted that will identify itself with the aspirations of the nation for an intensive and all-round industrial development—a development without which India cannot be assured for her political future under modern conditions.

¹³ The position has changed since the 15th of August, 1947. (See the following chapter.)

CHAPTER XV

TRENDS IN INDUSTRIAL LOCATION AND PLANNING

1. Distribution and Location of Cement, Glass, Chemical, Paper and Match Industries

The factors responsible for the existing distribution and location of half a dozen leading industries of India have been discussed in detail in the earlier chapters dealing with individual industries. The influence exerted by the development of means of transport, rate policies of transport agencies and the growth of skilled labour has also been discussed. Before taking up a general analysis of the broad industrial pattern of the country a brief review of the conditions governing the general distribution and location of a few more industries is essential. The distribution of a particular industry in the different regions of a country is, as we have already seen, generally dependent upon transport costs and labour costs. An industry has to incur transport costs in procuring various raw materials and fuel and in distributing its products in consumers' markets. The relative attraction of the raw materials and markets depends upon the nature of the raw materials and the nature of finished products. Some of the heavy, localized or weight-losing materials like iron ore, wood or coal attract the industry to the place of their occurrence, while others like light and pure textile fibres enable the manufacturing industry to locate itself near the consumers' markets. Different types of means of transport—road, rail, river or sea—available in different regions again influence the distribution of an industry.

The choice of a site for the manufacture of some of the basic products like iron, steel, cement, pulp, etc. is greatly influenced by transport costs. For the manufacture of one ton of pig-iron nearly $1\frac{1}{4}$ tons of iron ore and $1\frac{2}{3}$ tons of coking coal, and for one ton of finished steel 2 tons of ore and $1\frac{5}{6}$ tons of coking coal are required; if other raw materials like limestone are taken into account, every ton of finished steel requires the transport of 5 tons of raw materials in India. Similarly for the manufacture of 100 tons of cement, 160 tons of limestone, 38 tons of

coal and 4 tons of gypsum are required. On account of heavy transport costs such industries generally remain confined to the regions producing the necessary raw materials. But, as discussed in an earlier chapter, in industrially advanced countries like the U. S. A. in certain cases even the iron and steel industry has been drawn nearer to the markets.¹ The distribution of iron and steel industry in England and the U. S. A. has been also greatly influenced by cheap water transport. Some other industries like the manufacture of glass also use heavy and localized raw materials like sand, but on account of the nature of the final product they develop a tendency towards market-localization. Excluding coal or liquid fuel, nearly 60 lbs. of sand, 24 lbs. of soda ash and 6 lbs. of limestone are required to produce about 75 lbs. of glass; loss of weight takes place mostly in soda ash and limestone and the principal raw material, sand, is far more easily transportable than the final product, fragile glass. Thus transport costs exert their influence in favour of regions providing the markets for glass as against the regions containing the deposits of good quality sand. The same principle applies to the manufacture of certain heavy chemicals like sulphuric acid. Here also the transport of raw materials is more convenient and easier than the transport of the finished product. Finally, the element of transport costs is not entirely dependent upon the weight and distance of the materials provided by nature but is also affected by the transport facilities and rate policies of transport agencies. Regional distribution of industries is sometimes, very much influenced by the rate policies of railways. This fact is very clearly demonstrated by the early rate policy of the Indian railways, which was unduly biased in favour of the coastal regions and thus deprived the regions of the interior of their due share of modern industries.

The location of some industries is determined mainly by the nature of their raw materials; industries like butter or cheese making, meat packing, fish, fruit or vegetable canning, engaged in the processing of perishable materials, establish themselves in close proximity to the source of production of these materials. This tendency has been considerably modified by the development of modern methods of cold-storage and refrigeration. But some of the industries using fresh and bulky raw materials like

¹ See pp. 93-4.

sugar-cane have yet to confine themselves to the regions producing the necessary raw materials.

* The ratio of labour costs to the total cost of production is quite high in the case of a number of consumers' goods industries like the manufacture of textiles, leather goods, apparel, automobiles, transport equipment, etc. Naturally such industries are drawn towards thickly populated regions to take advantage of cheap labour. These regions provide, at the same time, good consumers' markets for the products of these industries. Some other industries like lace-making or embroidery come to the suburbs of large industrial towns in order to take advantage of cheap female labour furnished by the wives and daughters of workers engaged in other industries.

The distribution of industries in different regions is thus generally determined by transport costs, labour costs and other factors related to the nature of particular raw materials or the final product; but the distribution inside individual regions is very much influenced by the possibilities of securing external economies through the congregation of several industrial units in the same centre. In these centres external economies are secured through the establishment of industries utilizing by-products, undertaking finishing processes and supplying equipment, spare parts, etc. and through the development of banking, insurance and marketing organizations, reserves of skilled labour and technical and professional services. These factors bring into existence giant industrial agglomerations giving rise, mainly on account of the rise in land values, to deglomerating tendencies which, in turn, lead to the dispersal of industries inside the region itself. The possibilities of securing external economies are greater in those industries in which manufacturing expenses (especially labour costs) form a high proportion of the total cost of production. Consequently these industries develop a strong tendency to form agglomerations. The tendency of industrial integration also helps concentrations. Industries with several stages in the process of production, where the produce of one stage becomes the raw material for another stage, possess a strong incentive to combine all stages in one unit. The integration of plants producing pig-iron, ferro-alloys and alloy-steels is a well-known example of this tendency. But some other industries, which use several coarse or heavy and weight-losing materials like coal, wood, timber, rubber, iron, etc. in independent stages of

production wherein a considerable loss of weight takes place in the first stage, seek different locations in different stages. The first stages of these industries are located near the sources of supply of rough or heavy materials where these materials are changed into parts or half-finished goods—almost into ubiquitous materials; the subsequent stages are located near the consumers' markets where various components are assembled or half-finished goods given final shape by additional application of labour. Manufacture of parts of automobiles and their assembling, the preparation of wood-pulp and its conversion into paper furnish good examples of such industries. The Ford Motor Company of America owns its own coal and iron ore mines and timber reserves in the U. S. A. and its own rubber plantations at Ford Landia in the Amazon basin. Automobile parts are prepared by the Ford Motor Co. in a number of places conveniently located in relation to sources of supply of materials, and assembling is done by them near the markets at Detroit in the Lake region or even in towns like Bombay in foreign countries supplying the consumers' markets. In the case of paper industry the wood-pulp is prepared near the soft wood forests of Canada and the Baltic countries and is changed into paper in industrial and populous centres. This pulp is sometimes manufactured into paper in distant consuming markets in Japan and India.

The primary and basic factors affecting the distribution of industries among different regions, and their location, concentration and dispersal within the individual regions have been discussed above, but the dynamic conditions of the modern industrial system modify the effects of these factors considerably. The location and distribution of most of the consumers' goods industries are vitally affected by labour costs and are dependent upon the distribution of population. Industries or groups of industries, when they establish themselves in certain regions, considerably alter the distribution of population between different regions or within the individual regions; and with changes in the distribution of population the transport relations are also considerably altered. With the concentration of population in towns like Kanpur, the weight of consumption and the wage-levels in such centres are substantially changed. These changes profoundly influence the distribution of industries. Extensive inter-regional and intra-regional changes in the distribution of

industries are brought about by changes in the form of power used. In this connexion the changes brought about by the adoption of electric power in place of steam power are very significant. A dynamic industrial pattern is always changing to adapt itself to altered circumstances.²

The distribution and location of some more industries may now be examined in the light of the foregoing discussion. Our iron and steel industry is highly localized in Bihar and Bengal. With regard to its location the report of the Iron and Steel (Major) Panel, constituted by the Government of India in January, 1946, observes: 'Owing to the narrow geographical limits within which the principal raw materials are obtainable and the necessity of erecting large units in order to produce iron and steel at the cheapest cost, the regionalization of this industry in its primary form is not feasible or in the public interest. There are, in fact, only two or three localities in India where large new iron and steel plants can be economically installed.' The Panel recommended that the first unit should be erected in the C. P. and the second in Bihar near Jamalpur. The Central Government has decided to set up two big government-owned units, one in the C. P. and the other in Bihar. The location of the first is governed by strategic, and of the second by economic considerations.³ The distribution is entirely in conformity with the locational factors.

The most important section of the cement industry of India is located in a belt running from Bihar to Gwalior. Factories representing nearly 45 per cent of the total productive capacity of the entire country are situated in this belt, where the northern slopes of the Vindhya range gradually merge into the Gangetic plain. The location of these factories is very favourable as it gives them equally easy access both to some of the finest Indian raw materials found in the Vindhya as well as to the consumers' markets in some of the most densely populated regions of the Gangetic valley. The factories in the eastern section also enjoy the advantage of being quite near the coal region.

Up to this time the location of most of these factories is regarded as defective from the point of view of markets. The principal markets for cement, at present, lie in the great ports of Calcutta and Bombay, and in these markets most of these factories are handicapped by their remoteness. The Katni group of

² See pp. 245-6

³ See p. 108

factories is 670 miles from Calcutta and 680 miles from Bombay; Japla, where the works of the Son Valley Portland Cement Company are situated, is 370 miles from Calcutta, while the Associated Cement Companies' works at Lakhari are 610 miles from Bombay. But, as we expect the tempo of industrial development to be shifted from the coastal areas to the regions of the interior, this drawback may disappear in the near future. The remaining productive capacity of the industry outside this region is distributed in the Punjab, Sind, Kathiawar, Bombay, Mysore, Madras and Assam. Most of the factories are able to obtain limestone of good quality within a range of 20 to 30 miles. But in distant regions like the Punjab and Madras difficulty is experienced in obtaining from long distances suitable coal with low ash percentage for use in the kiln (which amounts to 50 per cent of the coal required for use in the works and which is not found outside Bengal and Bihar). Apart from this handicap, the distribution of the industry appears to be quite rational.

The most important section of the glass industry of India is located near Agra between the towns of Firozabad and Shikohabad. In the north the industry extends up to the towns of Bahjoi and Balawali, and Naini (near Allahabad) is an important centre in the east. Agra district alone accounts for the employment of 33 per cent and the United Provinces as a whole for 47 per cent of the total number of workers employed in this industry in India. The main reasons for this heavy concentration are the availability of the best deposits of sand required for glass at Loghra, Barhgarh (near Naini) and Panhai (in Band district) and of skilled glass workers. Shishgars (a community of glass and bangle makers) of Firozabad have been engaged in this work for generations. This type of location does not appear to be very rational. Although the presence of skilled workers is one of the important reasons for its location, the industry appears to be bound to the deposits of raw materials. Taking the fragile nature of finished glass into consideration raw material localization of the glass industry seems to be unscientific. The industry should be drawn to important consuming centres.

Another important centre of the industry is the 24-Parganas in Bengal. The province of Bengal employs about 23 per cent of the total number of workers. The Bengal section enjoys the advantages of the availability of good coal at reasonable distances and of the proximity of one of the best markets provided by

the industrial region in and around Calcutta. The location is scientific in spite of the fact that the sand has to be obtained from the U.P. Outside the U.P. and Bengal, the glass industry is of considerable importance only in the province of Bombay.

The growth of the chemical industry is essential for the general industrial development of the country. Most of the industries like textiles, paper, glass, rubber, etc. require chemicals. But the heavy chemicals industry of India is not much developed. There are two important centres of this industry—one in the 24-Parganas in Bengal and the other in Okhamandal in Baroda. The first accounts for the employment of 40 per cent and the second for 26 per cent of the total number of workers engaged in the industry as a whole. The Bengal industry has the advantages of coal and the markets in its neighbourhood. The Baroda industry is located near the source of some of its important raw materials and can market its produce quite conveniently in Ahmedabad, Bombay and the other textile towns of the region.

The industry consists of two groups—the acids and the alkalis; sulphuric and nitric acids are important in the first group and soda ash and caustic soda in the second. Sulphuric and nitric acids are in a liquid state and it is difficult and costly to transport them; but the raw materials like sulphur, pyrites or nitrates are easy to transport. On the other hand soda ash and caustic soda take the form of solids and are easily transportable. So the proper location for the units manufacturing acids would be in the vicinity of important industrial centres, while the works producing alkalis can be located near the sources of raw materials. Bengal and Bihar are more suitable for the manufacture of acids and Okhamandal for the alkalis. The Tata factory at Mithapur (Okhamandal) produces mostly alkalis. Important sulphur deposits are in Baluchistan (Pakistan) and the Indian industry may have to rely on pyrites. The same difficulty is likely to come in the way of the fertiliser factory at Sindri in Bihar. Gypsum from the Kewra and Dandot deposits of Western Punjab was to be used here for the preparation of sulphate of ammonia. After the separation of Western Punjab, some people think that the Sindri plant should be designed to produce nitro-chalk instead of sulphate of ammonia. For the success of the heavy chemicals industry it is essential that the production should be organized on an extensive scale in large units.

The principal seat of the Indian paper industry is the Hooghly district of Bengal, where there are four factories which produce more than 50 per cent of the present production. The paper industry was first established at Titagarh as a missionary enterprise. In the beginning rags, a more or less ubiquitous material, were used for paper manufacture. For some years sabai grass, obtained from the U. P. and Nepal was used as the principal raw material. But now the grass is gradually being replaced by bamboo pulp which is a distinctly superior and cheaper material. Good supplies of bamboo are available in the Chittagong Hill Tracts of Bengal and Cachar and Sylhet divisions of Assam. On account of the division of the country these supplies may not be easily available to the paper industry of Western Bengal. It may have to draw its supplies from the Sambalpur, Barpahar, Angul, Puri and Ganjam divisions of Orissa and Palamau division of Bihar. The Bengal industry may be at a disadvantage in respect of the supplies of these raw materials but it enjoys the advantage of nearness to coal and the Calcutta paper market. The paper factory at Dalmianagar in Bihar and the Orient Paper Mills at Brajrajnagar in Orissa are equally advantageously located. The paper mills at Lucknow and Saharanpur in the U. P. generally depend upon the use of grass as their principal raw material, the supplies of which are easily obtainable in the surrounding regions. The paper mill at Ambala in the Punjab sometimes experiences difficulties in obtaining the supplies of grass. All these paper mills of northern India from Titagarh to Ambala, employ more than 77 per cent of the entire labour force engaged in the paper industry of India.

The two important paper mills of southern India are located at Bhadravati (Mysore State) and in Travancore. Both the mills are situated in the bamboo growing tracts and enjoy the advantage of hydro-electric power. Besides bamboo, the best varieties of reeds suitable for the manufacture of paper are available in Travancore and the Tinnevelly district of Madras. The reed has not yet been used on any considerable scale. The paper mills of the Bombay presidency at Poona, Ahmedabad and Bombay have no special advantage either with regard to coal or grass but some of them use rags, waste paper, etc. Imported pulp is also used to a considerable extent. ✓

At the present time our most important raw material for making paper is bamboo and, as near as 2.38 tons of bamboo on

an average is required for making a ton of paper, the industry is drawn near the sources of raw materials in preference to markets. In Baltic countries and Canada soft woods of temperate forests are generally used for making paper pulp. The advantage of bamboo as a raw material in comparison with wood is that its cutting rotation is on an average 4 years as against 60 years for most species of wood. If the management of the bamboo forests is conducted on scientific lines there is an ample supply of raw materials for an expanding paper industry using bamboo pulp. Suitable soft woods like pine, spruce and fir are found in the Himalayas, but most of them are inaccessible at present.

Up to this time the main difficulty of the bamboo growing areas was lack of power. But in the near future hydro-electric power is likely to be available in the Palamau division of Bihar from the Son Valley and in the bamboo producing areas of Orissa from the Mahanadi Valley. In Travancore and Madras also hydro-electric power will be available almost in all parts and manufacture of rayon is likely to be taken up. If electric power is used in Bihar and Orissa and in Travancore and Madras for preparing bamboo- or reed-pulp on a large scale, the manufacture of paper can be started in centres near the consumers' markets on the basis of pulp obtained from the raw material producing areas. Mills using ubiquitous materials like rags, waste paper, etc. can very well be located in the vicinity of consuming markets, if the problem of collecting these materials is tackled on scientific and organized lines.

The match industry possesses some of its own peculiarities; markets for matches are universal and match boxes are normally sold at a uniform retail price throughout the country. These peculiarities favour a decentralized pattern of industry; but as the main raw material is wood—a heavy and localized material—for its success, a very wide distribution of the industry is not possible. In places where regular supplies of wood cannot be obtained at all times, large stocks of timber have to be preserved under water. Such storage is dependent upon perennial supply of water.

The most important centres of the industry are in 24-Parganas (Bengal), Rannad (Madras) and Thana (Bombay) districts. Assam (3.7), Bengal (28.9), the U.P. (6.5) and the Punjab (2.3) employ more than 41 per cent of the total number of workers employed,

while in peninsular India, Bombay (including Baroda and Bombay States) (26.2), Hyderabad (7.2), and Madras (including Madras States) (22.4) employ nearly 56 per cent of the total number of persons employed. The industry in the 24-Parganas in Bengal enjoys exceptional advantages. Suitable timber is found in the Sunderbans and regular supplies are brought by fishermen in their boats. Excellent water-ways of the province make transport easy and cheap. The local supplies of wood are also augmented by imports from the Andamans or Sweden. The industry is also favourably located with regard to the supplies of chemicals and skilled or semi-skilled labour. The factories in Assam, the U. P. and the Punjab are also favourably situated with regard to the supplies of suitable wood. The main advantage of the industry in the province of Madras is cheap labour. The location of the main match factory in the province of Bombay at Ambarnath appears to be defective. The wood has to be obtained from the Colaba and Kanara districts. In spite of the high price paid for the wood, the supply is not regular. Before the war, the other factories of the Bombay province used to import aspen wood from Sweden because the supply of Indian wood was irregular and the darker colour of its splints was not liked by the consumers.

The industry is an expanding one but the new factories should be located in those areas where suitable varieties of wood are available. No section of the industry should be dependent upon imports of aspen wood, as far as possible. In some of the provinces like Bombay, plantations of suitable types of wood should be started to enable the industry to be independent of foreign supplies.

2. Industrially Backward and Depressed Regions

The location and distribution of six important industries has been discussed in the earlier chapters and, after reviewing briefly a few more industries, we are now in a position to have a bird's-eye-view of the pattern of industrial distribution in India as a whole. Relevant maps showing the location and distribution of different industries have been given in different chapters. A careful perusal of these maps shows that there are two broad industrial regions; the first is a rectangular shaped region embracing almost the whole of the Ganga basin and extending up

to the river Ravi; in the east it touches Calcutta and in the west Amritsar. The second is a triangular region; if a line is drawn between the towns of Ahmedabad and Madras, roughly the region would lie to the south-west of this line. Only a section of the cotton industry in Malwa and Berar and a section of the sugar industry in north-eastern Madras would lie outside these regions. A glance at the map of India showing the distribution of population would indicate that these two regions embrace almost all the densely populated areas of the country. An electric power, hydel and thermal, map of India has recently been published by the Government of India. A study of the map shows that a majority of the important power stations, both hydel and thermal, fall within these two regions. Only a small group falls outside in the coal region in the lower Godavari valley. This distribution is quite natural in a country possessing mostly consumers' goods industries oriented to labour and consumers' markets.

The remaining areas of India comprising the province of Orissa and Orissa States, major part of Hyderabad and the C. P., the states of Chhattisgarh, Bundelkhand, Baghelkhand, Central India and Rajputana and the provinces of Sind, Baluchistan, the N.-W. Frontier and Western Punjab, may be properly described as *backward regions*. Prevalence of malaria and lack of means of communication in Orissa, Chhattisgarh, Baghelkhand, Bundelkhand, deficiency of rainfall and worst type of erosion in the Chambal basin (Malwa) and deficiency of water in Rajputana are the main problems which hinder the economic progress of these regions. Equally disastrous was the problem of 'fragmented sovereignty' in the political sphere. On account of the existence of hundreds of big and small and, in most cases, interspersed states, the problems responsible for the backwardness of these regions could not be dealt with effectively.

Thanks to the Hon'ble Sardar Vallabhbhai Patel, Deputy Prime Minister, and the Ministry of States of the Government of India as a whole, the problem of 'fragmented sovereignty' standing in the way of the economic advancement of these regions has been solved in a very satisfactory manner. The States of Orissa have merged in the province giving rise to the province of Utkal, which is nearly twice the size of the former province of Orissa; the Chhattisgarh States have been absorbed in the C. P.; the Baghelkhand and Bundelkhand States have formed Vindhya

Pradesh; the States of Bharatpur, Dholpur, Karauli⁴ and Alwar, lying to the north of the Chambal and West of the Yamuna, have formed the Matsya Union; the unification of the States of the Chambal valley leading to the formation of Malwa Prant and Rajasthan has been completed; Kathiawar States have formed the province of Saurashtra and the Deccan States have merged in the province of Bombay; the unification of the States of the Himalayan hills has brought into being the historic Himachal Pradesh extending from the banks of the Yamuna in the east to the borders of Jammu in the West; the union of the East Punjab States has now become a reality and, it is hoped, the question of the State of Hyderabad is also likely to be solved satisfactorily.⁵

These political changes have removed some of the greatest and the worst hurdles from the path of economic progress in the backward regions of India and have cleared the way for action. A reference to measures adopted in foreign countries for the development of the backward regions has been made earlier in the book.⁶ The example of multi-purpose Tennessee Valley scheme adopted in the U. S. A. for the development of the backward region comprising the valley of river Tennessee has become almost classic in connexion with the development of backward regions. In India we appear to have made a beginning by establishing the Damodar Valley Corporation constituted on the lines of the Tennessee Valley Authority.⁷ A number of other schemes in the valleys of the rivers Kosi (Bihar), Nayar, Rihand, Chambal and Son (the U. P. and C. I.), Mahanadi⁸ (Orissa), Indravati (Bastar), Narbada, Tapti, and Sabarmati (Bombay and the C. P.), Tungabhadra (Hyderabad and Madras),⁹ Dihang, Manas and Bharauli (Assam) are in the offing.

These schemes are particularly important in Eastern India. Two important regions lying between the rivers Mahanadi and Godavari and between Mahanadi and Son are very rich in forests and mineral wealth, especially coal, iron, manganese, mica and bauxite. Rainfall in these areas is also not deficient. Up to this

⁴ See pp. 3-4.

⁵ See pp. 247-50.

⁶ See foot-note p. 217. The Damodar Valley Corporation Act was passed by the Indian Legislature recently.

⁷ The foundation stone of Hirakud Dam was laid by Pt. Jawaharlal Nehru recently.

⁸ See pp. 5-6.

time these regions remained backward mainly on account of the curse of 'fragmented sovereignty'. But now the merger and unification of the small States have removed that cause. There are vast tracts in these regions—consisting of virgin land mainly inhabited by aborigines like the Santhals—which can be developed on ideal lines. Some people prophesy that by careful planning these regions can be converted into the 'Ukraine of India' or a 'New India' can be created within India. The development of these regions might also go a long way in solving the food problem of India. If we take into consideration some of the important multi-purpose and power-development schemes in the neighbourhood of these regions the above prophecy comes down to the realm of practicability. So far as the Chhota Nagpur and Chhattisgarh region is concerned the Rihand (Son Valley), the Damodar Valley and the Mahanadi Valley schemes are taking shape in the north, west and south of this region and electric power would be easily available for the development of this region. To the north and the south of the region lying between the Mahanadi and the Godavari rivers, the Mahanadi and the Machkand projects are being taken in hand.

The Kotah power project on the river Chambal has also reached an advanced stage of planning and will be able to supply the needs of the entire Malwa region. In this region there are huge tracts of eroded lands; but the irony of the situation is that the people are not yet conscious of the destruction going on or of the possibility of checking further loss of soil and of reclaiming the eroded lands. Dr R. K. Mukerjee, when he was preparing the plans for the economic development of the Gwalior State, was very anxious to do something to check erosion and to reclaim eroded lands. On hearing of Dr Mukerjee's anxiety some of the Jagirdars remarked, 'We are not able to understand why he (Dr Mukerjee) should be so much worried about erosion. It is a natural process and has been going on for generations.' The remarks clearly show the attitude of the people towards the problem. The problem of erosion can certainly be tackled on the lines followed in the valley of river Tennessee.

Some hopes are being held out of the possibility of solving the problem of scarcity of water, at least partially, in Rajputana. Professor Kaul of the Department of Botany of the Government Agriculture College, Kanpur, is said to have been successful in

locating and pumping out water in certain areas of Jodhpur State. The water of river Luni sinks down in this region through the loose and broken upper layers of rocks. Down below there is an impervious rock and the water forms a sub-soil reservoir on this rock. In the process of filtering down through the upper layers, the saline water of river Luni gives up its salt, and when pumped out is found to be fresh and fit for irrigation. If the experiment is a complete success it will create new hopes for Rajputana. A large number of streams originating in the Ambala division get lost on the borders of Bikaner. Nobody can say that the water of these streams is also not being stored in sub-soil water basins.

The phenomenon of the existence of industrially developed and backward regions and prosperous and depressed regions side by side is a natural corollary to the economy of industrial concentration. This type of industrialism is the child of the steam engine and the railway and was born in England in the middle of the eighteenth century. Steam power could be used only in the same building in which it was produced, with the help of shafts, pulleys and belts and could not be transported even over short distances. This resulted in the concentration of masses of men and raw materials in big factory buildings. The railway locomotive could not negotiate steep gradients and therefore the railway generally followed easier gradients mostly through river valleys along the streams. The railway transport was economical only in bulk and gave rise to concentrations of numerous factories in towns situated at the rail-head or at junctions. The industrial activity as a whole was confined to coal districts, plains and valleys; hilly or mountainous districts were generally neglected. The steam power concentrated masses of men into big factories and the railway concentrated the clusters of factories into rail-head towns; the towns grew into big cities and ultimately into shapeless ugly conurbations.

There developed an idea of world division of labour; England provided the manufactures while other countries, especially the tropical colonies and dependencies, furnished the raw materials and food. As a result of this tendency the urbanization movement reached its zenith in England; the balance between man and his environment, and between agriculture and manufactures was so much disturbed that at the beginning of the first world war England was not in a position to produce food for her

population for more than 155 days in the year. This naturally resulted in the lack of fresh food; a very substantial proportion of food served on English tables consisted of preserved and tinned foods.

This economy of concentration was essentially an economy of expansion, exploitation and exhaustion; the mining regions, especially the coal and iron mines, were getting exhausted in the manufacturing country and soil fertility, forest and animal resources were getting exhausted in raw material producing countries. There was a race for grabbing and virtually looting the natural resources of new countries. Pioneers literally looted the contents of gold or silver mines in America, Africa and Australia, gathered rich harvests by extensive cultivation of rich virgin soil and moved onwards as the resources began to show signs of exhaustion. Even old countries like India did not remain unaffected; the soil fertility was exported abroad in the form of jute, cotton, food grains, etc. without being adequately replaced. In America they have realized the mistake and are trying to retrace their steps by adopting the economy of conservation.

Near about the middle of the nineteenth century the earlier idea of the world division of labour was adopted in different countries in a miniature form; in place of the whole world being divided into industrial and non-industrial regions individual countries were divided into such regions. The industrial regions were further sub-divided into highly specialized iron and steel, textile and engineering regions; these sub-regions, in their turn, centred round highly specialized mass-cities or conurbations; steel towns like Birmingham and Pittsburg, cotton towns like Manchester and jute towns like Dundee came into existence. As discussed earlier India developed northern and south-western industrial regions, while the central area remained, more or less, backward; inside the broad industrial regions, specialized sub-regions like the iron and steel and engineering region of Bihar and Bengal, the sugar region of the U. P. and north Bihar, and the cotton region of Bombay came into existence. Central industrial towns also sprang up; cotton towns like Bombay and Ahmedabad, jute towns like Calcutta and steel towns like Jamshedpur grew up in course of time.⁹

⁹ One interesting observation, having a direct bearing on the industrial region around Calcutta, was made by the President of the American Machine Company, Mr Glen Overton, when, addressing the local Rotarians, he

As the process of industrialization progressed in new countries like the U. S. A. or in industrially young countries like India, the pattern of specialized industry gave rise to a new phenomenon of the emergence of industrially depressed regions or countries, along with their problems of mass unemployment. Industrially old countries like England began to feel a more or less permanent depression and regional depressions became a common feature of even the new countries. In the United States of America, when the cotton industry reached the Southern States, the cotton industry of New England States began to feel a depression; in India, the Bombay section of the industry began to feel a sort of atrophy and depression as soon as it began to spread in other parts of the country. The progress of the cotton industry in Japan and China was also partly responsible for the difficulties of the Bombay industry. Just before the beginning of the second World War the sugar industry of the U. P. and Bihar was experiencing almost similar conditions. Whatever other reasons may be given for this phenomenon of industrially depressed regions, the main reason from the point of view of our present study is the lopsided development of the resources of a region—excessive utilization of some particular resource and the neglect of many other resources--thereby upsetting the normal dynamic balance and thus making the region vulnerable to

said that development of large centres of industrial employment should be avoided if labour contentment is to be achieved. The failure to do this in his own country was now the cause of the greatest social and political problem there. He suggested that if places of employment could be close to the land and hold units of 1,000 men or less, the workmen would be happier, with greatly increased productive capacity. Drawing another lesson from his country, Mr Overton further remarked that urbanization and over-industrialization should be checked in time. About fifty years ago, he said, five-sixths of the American population lived on land or very close to it. Twenty-five years later, about half were on land and half in the cities. Now only one-sixth were on land and five-sixths in the so-called urban centres. Similarly about keeping a proper balance between agriculture and industry, he said that America had learned through bitter and costly experiences of repeated depressions that without a prosperous agriculture there could be no sustained prosperity. To India, he continued, agriculture was the key-stone of her national economic structure. The honour and dignity of increasing the productive value of land should be established and maintained, and she should keep one foot on land and the other on industry, nationally and individually.

the vagaries of the system of production of goods in anticipation of world demand.

Attempts are now being made to remedy the malady. In England the industrial regions of South Wales, Southern Lancashire, North-eastern England and Southern Scotland specialized mainly in coal mining, iron and steel and ship-building industries. These areas supported about 65 lakh people. The unfavourable world position of these industries led to the shrinkage of economic activity and thence to suffering and distress. Mass unemployment, factories at a standstill and an atmosphere of despair, all pointed to the collapse of the predominant branches of industry.

In order to relieve the distress the 'Distribution of Industry' Act was passed in 1945. This Act provides for Government help in the establishment of new branches of industry in depressed regions. Modern factories were to be built by Government and leased to private firms, or built by the firms themselves, help being rendered by Government, by giving priority in the allocation of raw materials, building materials, skilled labour, fuel, etc. As many as 259 plans for the building of factory premises have been accepted for South Wales alone. Thirty-one have already been built up and many others are rapidly nearing completion. Of these projects 160 were financed by Government. The branches of industry created in South Wales cover a very wide range of products including plastic goods, electrical accessories, motors, rayon goods, perambulators, reclaimed rubber articles, chemicals, and toys. Many of the factories supply goods which were not produced in Britain up to this time. Nearly 74 new factories have been opened on the site of the former Royal Ordnance Factory. Both large and small works are springing up. The largest of the new factories to be opened is a nylon mill, covering an area of about 1,00,000 sq. metres. It will be the largest nylon mill in Britain. These are only a few examples of the great industrialization plans for the depressed areas. Unemployment in South Wales, which was 1,12,000 in 1937 was reduced to 32,000 in 1947.

The development taking place in other depressed areas is nearly similar. In North-east England 40 new factory premises have already been completed and 520 projects are under consideration. In West Cumberland in Northern England 9 newly built factories have started production. In Scotland 61 new

works have been put into commission since the end of War. In making these areas accessible to new industries it has been necessary to build roads, clear away rubble, uproot brushwood and lay electric cables. The idea working behind the whole of this effort is that the old traditional industries should be supplemented by new branches of production so as to make the industrial structure of the depressed regions more balanced and varied.

From the social point of view the expansion and growth of mono-nucleated industrial cities like Bombay, Calcutta, Ahmedabad and Kanpur, with their factory areas acting as a gravitational force to suck up the population of the surrounding regions, threatens to undermine the very foundations of human society and culture. These human bee-hives have grown around an industrial nucleus just like a snow-ball; as places of human habitation they are negation of everything human. Kanpur is the biggest city in the U. P.; its population is now nearly 8 lakhs, but it does not possess a good public library containing reference books like the one at Allahabad or a good hospital like that of Lucknow.¹⁰ The entire importance of the town is tied up with its factories and connected activities.

Discussing such mono-nucleated industrial towns from the point of view of public health the Bhor Committee Report observes: 'The filth and squalor which we saw in Kanpur or the bustees of Calcutta are indescribable. A dark dingy room of about 8 feet square, built in such a manner that neither light nor air can enter it and with as many as eight or ten persons not infrequently living in it, represents the type of living accommodation which workers have to accept in these congested industrial centres. Washing and bathing facilities as well as latrine accommodation are often non-existent.... The position is no better in other large industrial cities such as Bombay, Ahmedabad, Madura and Coimbatore.' We cannot even imagine the condition of lakhs of street-dwellers in these cities.

The Report indicts the industrial cities from the point of view of health and hygiene only. There is yet another darker side of the picture representing the social side of the life of industrial workers.¹¹ In these large industrial cities family is no longer the unit of work. In most of the industrial cities of India majority of the workers live without their wives and children. But even

¹⁰ One is now being built up and equipped.

if all of them live together in the hovels of industrial towns, they work in far off places and on account of the distance of the factory from the chawls, bustees, etc. it is not possible for the family to meet as a unit even for meals.

There are four primary functions of the family and the household: (i) Physiologically it is meant for the recuperation and replenishment of the human body and it provides the most common ground for the meeting of sexes for companionship, recreation and procreation; (ii) Socially it is the means of association for different age-groups; (iii) Educationally it is the main place for the bringing up and the training of the senses of the young before their attaining the school-going age; and (iv) Economically it is a place for the practice of family crafts like spinning, knitting, etc.¹¹ The family as a unit for the performance of these vital racial, social and cultural functions has come to be forgotten in the industrial cities. As an individual the worker is, more or less, a specialized machine in flesh and blood: he has lost touch with mountains, lakes, woods and the landscape which form the very basis of his animal existence. The industrial city has deprived man of his primeval background. For breeding children and developing them into balanced men and women the environment of the home and the country-side is essential; the industrial cities produce men and women with distorted personalities, not in touch with basic realities.

The economy of private enterprise and industrial concentration takes into account transport costs, labour costs and the advantages of agglomeration, and ignores entirely the vital considerations of social costs and the strategic security of the nation. The individual entrepreneur while deciding the location of his factory thinks of his own money costs and profits and, as a big industrial centre offers him more facilities of securing external economies, he generally decides to locate his unit there. He is mainly concerned with the money economies which he is able to achieve in connexion with the supply of labour and raw materials, disposal of manufactures and by-products, purchase of equipment and spare parts, and the facilities offered by repair shops, banking and insurance institutions; and he is entirely unmindful of the costs which society has to bear in establishing and maintaining additional hospitals, sanatoria, asylums, orphanages, etc. for those workers who lose

¹¹ Lewis Mumford: *City Development*.

their health Contracting foul diseases in the slums of industrial cities. On account of the premature loss of health or death of the skilled or semi-skilled workers, society is not only deprived of their contribution to the wealth of the nation, but also has to bear the cost of supporting their dependents. Work and life under unhealthy and depressing conditions lower the physical, mental and moral stature of the workers substantially and ultimately reduce their productive capacity.¹²

These social costs are not unavoidable. The decentralized system of industry, by removing the evils of concentration, not only avoids the social costs but also secures for the society additional positive benefits and advantages. In pre-war Japan 43,394 (nearly 90 per cent) cotton weaving establishments out of a total of 48,389 employed not more than 4 hands each: the number of workers in small bicycle workshops employing not more than 4 hands each constituted 65 per cent of the total. The conditions in rayon, woollen and rubber industries were nearly similar. As much as 60 per cent of the total production of rayon textiles and 79 per cent of woollen textiles came from small workshops scattered in villages and small towns. The people lived and worked in healthy surroundings and in majority of the small workshops family as a unit played the most important role. The Japanese tapped a source of additional labour supply most unusual for countries like India. The workshops requiring additional labour recruited young, unmarried girls of their neighbours. Proper arrangements were made for their boarding, lodging and recreation; in spare time they were trained in useful domestic arts like house-keeping, cooking, serving, etc. Liaison between the families of the girls and the factory was maintained through the persons who introduced the girls to the factory. Girls coming from poor families helped their parents with their earnings while others accumulated money for setting up a house after marriage. Social losses and costs involved in one system and social gains and benefits arising out of the adoption of the other are self-evident and need no further arguments to prove their existence.

Besides social considerations the questions of modern military strategy are equally important. New weapons like the flying bomb and the atom bomb have almost sealed the fate of big industrial concentrations and super-cities. Excessive concentration of population and industry in vulnerable areas is undesirable.

¹² See also pp. 235-8.

After the establishment of the Socialist Soviet Republics the Soviet Government acted with great wisdom and foresight. It created some of the biggest industrial undertakings in the eastern region, remote from any possible attack by land or air. The Ural mountains contain several huge factories: the 'Ural-Mash' at Sverdlovsk, the greatest agricultural machinery plant in Europe, a steel plant at Novotagil, the 'metallurgical giant' at Magnitogorsk in the southern Urals and a chain of chemical factories in the western Urals. The Russian industry spreads beyond the Urals, far off to the east. Stalinsk, which has an even bigger steel plant than the one at Magnitogorsk, is situated 1,500 miles east of the Urals. And farther still, new centres of industry like Khabarovsk and Voroshilovsk, have sprung up in places which were formerly open steppe or fishing villages. The mighty industrial structure in the Urals and beyond is the backbone of Russia's war potential and a classic example of foresight in industrial location from the point of view of military strategy.¹³ In Great Britain and other countries similar policies are being followed; firms engaged in the production of armaments, the Government munitions factories and key-industries are being located in less vulnerable and sparsely populated areas. But in India we are still adding some of our latest key-industries to the coastal areas of Bombay and Calcutta. Two big automobile factories—the Premier Automobiles and the Motor House Gujarat—and one textile machinery factory—The National Machinery Manufacturers Ltd.—are being located at Bombay; the Hindustan Motors Ltd., and the Machinery Manufacturers' Corporation Ltd.—are to be located at Calcutta. It is presumed that these concerns have obtained licenses from the Government of India for starting the factories in these cities.¹⁴

- The economy of concentration is gradually yielding to a pattern of decentralized industries, and the master thinkers of our age like Patrick Geddes, Lewis Mumford and Radhakamal Mukerjee seek to remedy the ills of the technological society by introducing decentralized regional economy, being the latest stage in the process of industrial evolution. Regionalism is the child of electric power and the roadway. The electric motor strikes at the root of the concentration of masses of men in a single factory building and the automobile removes the necessity

¹³ Walter Durafty : *The Kremlin and the People*. Also see p. 238.

¹⁴ See p. 235 also.

of concentrating numerous factories in a big industrial town. Regional economy is based on the principles of conservation of resources and the development of varied and decentralized industries.¹⁵ The beginning of conservation is made by utilizing running water—a perennial and inexhaustible source of power—for generating hydel energy; other steps in the process of conservation, creation of dams and reservoirs, and soil conservation, flood control, afforestation, etc. follow each other in the nature of cause and effect till the conservation of the entire unit as a region is secured and a dynamic balance between the people and the resources is established. In a regional pattern there is no place for distinct industrial and agricultural areas, for super-cities and pauper, deficit villages. Decentralized industry seeks a wider rural basis and numerous villages form the embryos of poly-nucleated, small-sized towns and moderate-sized cities which provide for economic, educational, social and cultural needs as well as other amenities of modern urban life. This process will bring about such an intimate relationship between agriculture and industry that it will be difficult to draw the line between the spheres of the two. Not only small-scale and cottage industries but large-scale agro-industries will also come to rural areas. Mixing of rural and urban relationships will bring about 'rurbanization'. In an economy of this type, it will be difficult to demarcate the spheres of large and small-scale industries. Some of them, like weaving, bicycle manufacture and watch-making may be carried on on a large scale as well as on a small scale. In such production family, as a unit, plays the most important role and thus the regional pattern of decentralized industry restores the family to its proper position, obliterates the distinction between the rural and the urban and brings the individual in touch with his primeval environments.

It is rather impossible to give any boundaries of regions even in the purely physical sense. Geographically, every region possesses its own configuration, soil, climate and vegetation. But even these characteristics gradually merge into those of the adjacent regions at the margins. From the social and cultural points of view, the regional characteristics are even more shadowy as they intermingle at the margins. The difficulties of delimiting the geographical and cultural boundaries of different regions are very clearly demonstrated by the Bengali-Bihari or

Bihari-Oriya controversies of various types. In spite of these difficulties, it is possible to speak of different regions like Bengal or the Punjab for all practical purposes both geographically as well as culturally. But in defining a region, *it is essential to take an area large enough to include a sufficiently wide range of interests and small enough to keep these interests in focus so as to make them a subject of direct collective concern.*¹⁶ As suggested by the Economic Programme Committee of the A.I.C.C. it will be too arbitrary to regard an area as a region simply on the basis of its having a population of ten lakhs.

Taking these factors into consideration we can conceive of a number of, more or less, definite regions both from the point of view of geography as well as of culture. Besides Bengal and the Punjab, we can talk of the Assam Valley, Malwa, Gujarat, Saurashtra, Maharashtra, Utkal, Mysore and the Ganges Valley (except delta area) as distinct regions. Some of them like Malwa (consisting of the valley of river Chambal and enclosed by the Vindhya, the Aravalis and the river Yamuna), and the Assam Valley are very clearly demarcated in the geographical sense and some of them like the Ganges Valley have to be sub-divided into sub-regions. There are some regions like Malwa, Mysore or Chhota Nagpur which are plateaus but, in many cases, the regions are almost identical with river systems or river valleys. The reason is that most of the rivers of the world have acted as unifying agents throughout their valleys in more than one respect. In the geographical sense, the river Ganga transported rich silt from its upper reaches and deposited it all along its banks and the delta as well as provided irrigation; in the economic and commercial sense, it transported goods and deposited loads at places like Kanpur, Patna and Calcutta; in the social sense it transported culture and deposited it at places like Prayag, Kashi and Nabadwip. It is no wonder then that such river valleys constituted economic and cultural regions and supported well-balanced civilized communities through the ages not in India alone but also in China, Egypt and Iraq. After the lapse of centuries, the river valleys are once more going to play their part as economic and cultural regions. Some of our important river valley schemes have been mentioned earlier. After careful survey the whole of India can be divided into suitable

regions for the purposes of economic and industrial development and planning.

Regional development envisages a decentralized pattern of industry. But our discussion in this as well as in previous chapters with regard to the location and distribution of industries shows that most of them are concentrated in the regions producing basic raw materials. In the case of certain industries like iron and steel and cement, which depend upon heavy and localized raw materials, and like sugar, which depend upon fresh agricultural raw materials, such location is regarded as rational even from the theoretical point of view. The same thing, however, does not hold good in the case of textile industries, especially cotton. But if we compare the maps on pages 26 and 41 we find that a majority of the cotton textile centres are located in or around the most important cotton producing region of India. Theoretically the industry can very well be located nearer the centres of consumption, and from this point of view the development of cotton textile industry in the plains of northern India is very inadequate in spite of the fact that it has become the most wide-spread mill-industry of India. The position of the glass industry is nearly similar. Its excessive concentration near the deposits of raw materials is not very sound theoretically. On account of the fragile nature of glass the industry can advantageously be located near the centres of consumption. A review of the dispersion of industries during the inter-war years (1918-1939) indicates that textile (cotton, woollen and silk), soap, match and cement industries have shown marked dispersion along with their growth. The dispersion of sugar industry outside the U. P. and Bihar, the region of its heaviest concentration, has been mainly governed by the extension of irrigation facilities. With the development of irrigation facilities, as a consequence of the progress of the multi-purpose river valley projects and pumping schemes, the tendency towards dispersion is likely to be accelerated. Leather, paper, glass and chemical industries have also manifested a tendency towards dispersion along with their expansion. Even the highly centralized jute industry has shown some dispersion. A few mills have been established in Bihar, the U. P. and the C. P. The decentralization trends exhibited by different industries should be carefully examined and encouraged in order to achieve a better regional distribution of industries. It has been

already mentioned that decentralization movement is the offspring of the electric power and the roadway. The Central and Provincial Governments have formulated very ambitious schemes of electrification and road development and the best way to help the decentralization movement is to execute the power and road development plans with all possible determination and energy.

For the establishment of industrial units in new centres the existence of local financial institutions and the availability of people possessing necessary industrial and commercial experience and initiative are essential. In this connexion the story of the dispersion throughout India of a class of people popularly known as Marwaris is very interesting. Originally these people are the inhabitants of a small area lying nearabout the towns of Nawalgarh and Pilani in Shekhavati (Rajputana). After the establishment of British rule these people moved in search of business to almost all parts of India and especially to industrial and commercial centres like Calcutta. Most of them possessed no capital but they were so frugal in their habits that they succeeded in creating flourishing business and industrial concerns in the course of a few years. Now they are found throughout the country from Birlapur (near Calcutta) to Bombay and from Dalmia Dadri (Punjab) to Dalmiapuram (Madras). The names of their leading families like Birlas, Dalmias, Poddars, Seksarias, Singhaniyas, Goenkias, etc. are well known not only in India but even in foreign countries. At the present time the Marwaris carry on indigenous banking, trade, commerce and industry throughout northern and central India. They have established themselves not only in cities and towns but also in villages and they are the people who possess the necessary experience and initiative for starting and managing industrial enterprises. Perhaps, with the exception of Jews, no other single community has shown a tendency of such wide dispersion.

In connexion with the questions of finance and initiative it is also very often suggested that these problems should be solved by the establishment of Industrial Co-operatives. In Western countries co-operation has not been a success in the field of industrial production. In England, of course, some of the consumers' whole-sale societies undertake the production of some of the articles of everyday use like shoes, biscuits, etc. required by the member retail-societies. Industrial co-operation

as an organization of the workers to produce goods for the ordinary market has not been a success. The Industrial Co-operatives in China are said to have been a great success in war time. The possibilities of organizing small-scale industries on co-operative lines in India in normal times will have to be explored.

3. Progress of Industrial Planning in India

The desirability of establishing a decentralized system of industry from the social and economic points of view was recognized even before the Second World War but the war-time destruction of industrial concentrations made the people painfully conscious of the necessity of dispersing the industries from the strategic point of view also. The Government of India, in their statement of industrial policy issued in April 1945, indicated their future line of action in this connexion very clearly. The relevant portion of the statement reads as follows:

'Government have come to the conclusion that they must take power to license industrial undertakings. They have, at present, no power, except for emergency war-time controls, to regulate the growth of industry; normally, a person may put up a factory wherever he likes and may manufacture in it whatever commodity he chooses. One effect of this unregulated freedom to promote industrial enterprises has been the concentration of industries in certain areas, for instance, the manufacture of cotton textiles has been concentrated in Bombay and Ahmedabad, sugar in the U. P. and Bihar, paper in Bengal. In some cases there are good grounds for concentration of particular industries in particular areas, but in many cases it has been the result of fortuitous and haphazard growth. There are vast areas in this country which, though suitable for industrial development, have not been developed, because industry has tended to flow in particular channels.

'The effects of such concentration are economic, social as well as strategic. It seems unsound, from the strategic point of view, that so large a proportion of industry should be concentrated in a few cities which might well be vulnerable to attack. On the social side, it is clear that concentration creates housing problems of a most acute type. Perhaps, even more important consideration is that, concentration deprives other areas of the

country of the beneficial effects of diversified economy. Lastly, it is not clear that concentration is necessarily economically sound. The markets for textiles, for instance, are situated all over India, and cotton, the main raw material, is also grown in various parts of India. From the point of view of the consumer, it would obviously be right to cut out unnecessary transport costs and to locate manufacture where both the raw material and market are situated. Even where concentration appears relatively cheap on the basis of financial costs of production and distribution, it would, in many cases, be found, in the long run, both socially and economically cheaper to disperse industry, if regard is paid to the benefits of a widely spread industrial structure and its integration with agriculture.'

In pursuance of this policy the Government appointed a number of Industrial Panels¹⁷ to make their recommendations, besides other things, on the extent of development desirable and possible, and the best location of the units of industries with reference to all relevant factors. The findings and recommendations of some of the important Panels are given in a tabular form in the following pages.

The Industrial Panels appointed by the Central Government dealt with the development of major industries only. Other Committees and Boards set up by the Government of India prepared the plans and schemes for the development of railways, roads, post and telegraph, civil aviation, broadcasting, mines, power and agriculture and the expansion of education and health services. Provincial and State Governments also prepared the development plans for irrigation, power, roads, ports, agriculture, forests, livestock, fisheries, co-operation and industries

17 (1) Iron and Steel (Major), (2) Iron and Steel (Minor), (3) Prime Movers, (4) Automobiles and Tractors, (5) Ship-building and Marine Engineering, (6) Electrical Machinery and Equipment, (7) Industrial Plant and Machinery (Heavy), (8) Machine Tools, (9) Light Engineering industries, (10) Heavy Chemicals industries, (11) Fine Chemicals, (12) Paper, Pulp, etc., (13) Plastics and Celluloids, (14) Rayon and Artificial Silk, (15) Sugar, Alcohol, etc., (16) Glass, (17) Refractories and Ceramics, (18) Soap and Oils, (19) Paints and Varnishes, (20) Electro-chemical industries, (21) Wool, (22) Silk, (23) Coir, Rope, etc., (24) Hosiery, (25) Ready-made Clothing, (26) Non-ferrous Metal industries, (27) Leather and Leather goods, (28) Scientific Instruments, (29) Cotton Textiles. For Cement and Vanaspati no Panels were appointed as there was already sufficient material with Government.

TABLE LX

| Industry | Present Consumption (Annual) | Present Production (Annual) | Future Demand and Target of Production (Annual) | | Location and Distribution of New Units |
|----------------------------|------------------------------|---|---|--|--|
| | | | tons | tons | |
| 1. Iron & Steel | | | | | |
| Pig Iron | 1,42,000 tons | Consumption 1,42,000 Exports 5,41,000 | Indigenous Import Demand Target | 7,00,000 3,00,000 20,00,000 25,00,000 | Steel—Two new units with an initial capacity of 5,00,000 tons each, one in C. P. and the other in Bihar. |
| Steel | 10,00,000 (Roughly) | Present productive capacity of all classes of steel | 12,64,000 | | |
| | | Expansion within 5 years: | | | |
| | | Tatas— | 1,50,000 | | |
| | | Scoob— | 2,00,000 | | |
| | | Mysore— | 30,000 | | |
| | | Ishapore— | 60,000 | 4,40,000 | |
| 2. Heavy Chemicals | | | | | |
| (a) Sulphuric Acid | 55,760 " | | | | Sind, Bihar, C. P., Bombay and Madras. |
| | | | | | 59,000 3-year target 1,52,600 |

| | | | | | | |
|-----------------------------|----------|----------|--------|---------------|----------|--|
| (b) Soda Ash | 1,07,500 | Capacity | 74,000 | 5-year target | 2,70,000 | Four new plants of 50,000 tons each. One each in Sind, Bihar, the C.P. and South India. |
| (c) Caustic Soda | 54,000 | Capacity | 12,600 | " | " | One 11,000-ton mercury cell plant in Bihar, others in different parts of India. |
| (d) Ammonia | " | Capacity | 1,500 | " | " | Plants are being installed at Sindri (Bihar) and Alwaye (Travancore). |
| 3. Electro-Chemicals | | | | | | |
| (a) Ferro-manganese | " | Capacity | 2,000 | " | " | Sandur State. Suitable for manufacture in large quantities. |
| (b) Ferro-Silicon | 4,000 | Capacity | 2,000 | 5-year target | 40,000 | Mysore is planning production up to 4,000 tons. |
| (c) Aluminium | " | Capacity | 7,500 | " | " | In addition to plants at Asansol and Alwaye one more plant of 5,000 tons immediate capacity ultimately to be raised to 8,000 to 10,000 tons to be installed near a source of power supply. |

TABLE IX—(cont'd.)

| Industry | Present Consumption (Annual) | Present Production (Annual) | Future Demand and Target of Production. (Annual) | Location and Distribution of New Units |
|-------------------|------------------------------|-----------------------------|--|---|
| (d) Copper | ... | 6,000 tons | 5-year target 10,000 tons | Deposits of Jaipur and Sikkim to be examined. One 5,000-ton plant to be established in one of the sea-port towns for obtaining metal from imported scrap. |
| 4. Rayon | 60 to 70 tons a day in 1939 | Nil | 6 or 7 factories with a productive capacity of 10 tons per day to be set up immediately, 4 or 5 later. At least one factory to prepare acetate rayon and the rest viscose rayon. 5-year target—3,05,00,000 lbs. | Punjab, Tehri Garhwal, Bengal, Orissa, Rewa, C.P., Bombay, Madras, Mysore and Travancore. (Certain localities in these provinces and States). |
| 5. Wool | 1,90,27,000 lbs. | 79,25,500 lbs. | | Kashmir, Punjab, (Chhetharta, Khassa, Amritsar, Panipat, Multan), Jaipur, U.P. (Rampur, Benares, Mirzapur), Bihar, Calcutta, Ahmedabad, Baroda, Bombay. |
| 6. Cotton | About 64,000 lakh yds. | Capacity 48,000 lakh yds. | To be raised to 72,000 lakh yds. 5-year target of expansion 17,000 lakh yds. | Given at the end of the table (See page 288) |

| | | | | | |
|------------|---|---------------------------------|--------------------------|--|---|
| 7. Sugar | Demand 50 per cent higher than in 1939 | Average from 1939-40 to 1943-44 | 18,50,000 tons by 1950 | North—Sind N.W.F.P. 1 mill Punjab 3 mills (including States) Bihar 1 mill Bengal 3 mills Assam 1 mill South—Bombay (including States) Baroda 1 mill Madras 3 mills Travancore 1 mill Hyderabad 1 " Orissa 1 " | Scope for extension to N.W.F.P., Punjab, Bengal, Bihar Orissa, C.P. |
| | | 10,84,000 tons | | 20 mills | |
| 8. Leather | (i) Vegetable & Bark tanning: (a) Bag tanned leather (b) Half-tanned leather hides | ... | (Pre-war) 91 lakh pieces | 95.5 lakh pieces 86 " " 86 " " " " | (This represents no advance as the pro- duction has fallen considerably and the attainment of pre-war level will take time.) |

TABLE LX—(contd.)

| Industry | Present Consumption (Annual) | Present Production (Annual) | Future Demand and Target of Production (Annual) | Location and Distribution of New Units |
|--|------------------------------|-----------------------------|---|--|
| Goat and sheep skins | ... | Pre-war 190 lakh pieces | 272 lakh pieces | Scope for expansion in Sind, Kathiawar, Bombay. |
| (c) Pit tanned heavy leather (for sole, harness & belting) | ... | “ 6 “ “ | 42 “ “ | Concentrated at Kanpur and Calcutta. May be extended to N.W.F.P., Bihar, C.P. and Kathiawar. Scope for expansion in the Punjab. |
| (ii) Chrome Tanning | | | | Room for very great expansion. Nagpur is suggested as one suitable centre. |
| (a) Box & Willow sides | ... | Pre-war 730 lakh sq. ft. | 1,400 lakh sq. ft. | At present only two European tanneries at Madras and M/s. Cooper Allen & Co. at Kanpur, prepare it. New tanneries are suggested in Bengal, Bihar and Madras. Hand shoe-making factories at Agra and other places should be mechanized. |
| (b) Glace Kid leather | ... | Not given | 30 lakh pieces above current production | New machine shoe factories to be established elsewhere. (Centres not specified.) |
| (iii) Footwear | | | 15,000 lakh pairs | |
| (a) Indigenous shoes | ... | 7,000 lakh pairs | | |
| (b) Western type of shoes | ... | 300 “ | 450 “ | |

9. Glass

| | | Pre-war production | Present capacity | 5-year target |
|--------------------------------|--------------------------------------|--------------------|--------------------|--|
| (a) Bangles | ... | 18,000 tons | 18,000 tons | 10 per cent increase |
| (b) Beads and false pearls | Imports were estimated at 4,200 tons | ... | 120 " | 4,200 tons |
| (c) Bottles and Phials | 40,000 tons | 100,000 " | 100,000 " | No increase necessary. |
| (d) Lampware | ... | 10,000 " | 14,000 " | Quality to be improved. |
| (e) Tableware | ... | 5,000 " | 7,500 " | |
| (f) Sheet glass | 40 lakh sq. ft. | 2001 lakh sq. ft. | 420 lakh sq. ft. | |
| (g) Pressedware | ... | 2,000 tcs | 4,000 tons | |
| (h) Plate & flowered glass | ... | Nil | 37 lakh sq. ft. | |
| (i) Scientific glass apparatus | ... | Negligible | Rs. 10 lakhs | |
| (j) Glass shells | ... | 140 lakh pieces | 250 lakh pieces | |
| (k) Optical glass | ... | Nil | No definite target | To be started under Government auspices. No definite places suggested. Nearness to market should be a greater determining factor than nearness to raw materials. |

TABLE LX--(contd.)

| Industry | Present Consumption (Annual) | Present Product- tion (Annual) | Future Target of Produc- tion (Annual) | Location and Distribution of New Units |
|--|---------------------------------|-----------------------------------|---|---|
| 10. Paper | Anticipated in | | | |
| (a) All types other than newsprint | 1951 | 1956 | 1944 | 1951 |
| | 2,20,000 tons | 3,12,000 tons | 90,000 tons | 1,69,000 tons |
| | | | | 3,02,000 tons |
| (b) Newsprint | 60,000 | 1,00,000 | " | Nil |
| (c) All types of Boards | 75,000 | 1,19,000 | " | 24,000 tons |
| | | | | 75,000 |
| | | | | 1,19,000 |
| 11. Cement | Estimated 1948-49 | 1945-46 Actual | Estimated 1948-49 | 1950-51 |
| | 38,52,000 tons | 20,75,340 tons | 35,82,000 tons | 45,27,000 tons |
| | | | | 51,00,000 tons |
| | | | | 1951-52 |
| | | | | Given on opposite page * |

TABLE LX-A
Location and Distribution of New Units of the Cement Industry

| Province or State | Capacity of existing works (tons) | Allocation of additional capacity (tons) | Province or State | Capacity of existing works (tons) | Allocation of additional capacity (tons) | |
|-------------------|-------------------------------------|--|---|--|--|----------------------------------|
| | | | | | Capacity of existing works (tons) | |
| Sind | Rohri Driugh Road Wah | 70,000 2,00,000 1,65,000 | Bengal Assam C. P. Bhopal | Chhatak Kymore ... | 70,000 3,55,000 ... | 1,20,000 1,75,000 1,00,000 |
| Punjab | Dandot Surajpur | 70,000 1,00,000 | Gwalior Bundi Bombay Baroda | Banmore Lakhari ... | 60,000 2,20,000 ... | 1,00,000 1,00,000 ... |
| Patiala | Dalmia Dadri | 70,000 | Dwarka Porbandar | Dwarka Porbandar | 1,80,000 42,000 | 1,00,000 |
| Jind | ... | ... | Jamnagar Hyderabad Mysore Madras | Shahbad Bhadrawati Kistna Madukarai | 1,00,000 2,10,000 20,000 1,80,000 | 30,000 |
| Sirmor | ... | 1,00,000 | Dalmiapuram Bezwada | Dalmiapuram Bezwada | 70,000 30,000 | 5,30,000 |
| U. P. | ... | 1,00,000 | Travancore | ... | 50,000 | |
| Tehri | ... | 1,00,000 | | | | |
| Garhwal | Dalmia Nagar Kalyanpur | 1,50,000 40,000 | | | | |
| Bihar | Sone Valley Khulari Chaiabasa | 2,00,000 1,00,000 1,00,000 | | | | |
| Gangpur State | ... | 1,00,000 | | | | |

TABLE LX-B
Statement showing spindles installed in India as on 1st January 1945, and allocation of new spindleage

| Zone | Spindles installed as on 1st January 1945 | Allocation of new spindleage | | Allocation of new spindleage Coarse spindles |
|------------------------------|---|------------------------------|-------------------------|---|
| | | Fine spindles | Coarse | |
| Sind (including Baluchistan) | 2,216 | ... | | 1,00,000 |
| Punjab (including Delhi) | 2,24,023 | 1,14,000 | | 4,23,000 |
| U. P. | 7,73,288 | 1,14,000 | | 1,75,000 |
| Bihar | 25,040 | 38,000 | | 1,75,000 |
| Bengal (including Assam) | 4,80,924 | 1,25,000 | | 2,25,000 |
| | | | (coarse and fine mixed) | |
| Orissa | ... | 1,00,000 | | 1,25,000 |
| C. R. | ... | 19,000 | | 1,00,000 |
| Rajputana | ... | 76,000 | | 1,00,000 |
| Bombay | ... | 38,000 | | 75,000 |
| South | ... | 1,71,000 | | 3,75,000 |
| Total | 1,02,95,445 | 8,85,000 | | 18,73,000 |
| | | | (coarse and fine mixed) | |
| Grand Total | ... | 1,00,000 | | 28,58,000 |

and the expansion of education and public health services. Some of the provincial plans were fairly carefully integrated wholes, but others were little more than collections of departmental schemes hastily thrown together. The Advisory Planning Board was appointed in October, 1946, to do a rapid survey of all the Central and Provincial plans and to make recommendations regarding the co-ordination and improvement of planning, and as regards objectives and priorities and the future machinery of planning. The Board submitted its report on December 18, 1946, which contains their recommendations with regard to machinery of planning, supply of trained personnel, agriculture, river development and electric power, industries, mining, railways and research.

It appears that in spite of all the tall talk the real work of planning has not yet been started. We are yet trying to feel our way. What we are still doing in India is planning for situations and times which exist no more. Planning in terms of isolated processes of agriculture, industry, transport, etc. is a thing of the past. Such type of planning can hardly be called regional because the regional plan is prepared for all types of activities; it takes into consideration not only the provision of food, clothing and shelter, but also includes recreational, educational, and social needs of the people in its scope. It provides not only for the development of agriculture, industries, dams, reservoirs and highways but also for the building of libraries, schools, art galleries, theatres, town halls and hospitals. *The plan is prepared as a whole for the people by taking the region as a unit;* after its earlier stages of survey, evaluation and preparation, it is not so much executed by the authorities as it is absorbed by the people through their economic, political and social institutions. Industrial decentralization on a regional pattern must be accompanied by political and social decentralization as well, if it is intended to be a success. People must be trained to shoulder the responsibility for their individual as well as collective economic and social well-being.

The utility of the plans prepared before August 15, 1947, has been further diminished on account of the partition of the country into two parts after that date. Up to that time the economy of the country was based on the resources of the whole of India. Sind and Western Punjab were surplus regions with regard to the production of foodstuffs like wheat and rice and

were the main sources of supply of long-stapled cotton to the mills of Delhi, Ahmedabad, Bombay, etc; Eastern Bengal was the main source of supply of jute fibre to the Calcutta mills. But the areas now comprised in Pakistan are extremely poor in mineral resources and modern industries. On account of these factors the economy of both the parts, now known as Indian Union and Pakistan, was inter-dependent; seceding areas supplied cereals and raw materials and India in return supplied the manufactured articles.

The area and population of Pakistan are 14.92 and 17.19 per cent of the pre-partition India, but she gets nearly 20 per cent of the entire sown area, 26.27 per cent of the area under rice, 24.95 per cent of the area under wheat, 73.92 per cent of the area under jute and 13.02 per cent of the area under cotton. American varieties of long-stapled cotton are mostly confined to West Punjab and Sind. The proportion of food and fibre crops which goes to Pakistan is much higher in relation to her share of the entire area and population. Naturally, Pakistan is a surplus country with regard to food and fibre materials.

But so far as industrial equipment is concerned Pakistan is poor. There is practically no good coal, iron, manganese or mica in her territories. With regard to industries, the entire iron and steel industry, all the jute mills, 97.1 per cent cotton mills, 93.0 per cent sugar mills, and 83.3 per cent cement factories are situated in the Indian Union. So far as the industrial employment is concerned nearly 98 per cent of the workers are in the Union and only 2 per cent are engaged in Pakistan.

Raw materials and manufactured goods are now not flowing freely from one dominion to the other and consequently both the countries are experiencing difficulties in executing the post-war economic rehabilitation programmes. The Indian Union needs about 60 lakh tons of food-grains annually from abroad. These imports of food are a great obstacle in the way of securing capital goods from America and other countries for the industrial development of the country, as a substantial proportion of the foreign exchange resources of the country is being devoted to the purchase of food. The jute and cotton industries of the Union are also experiencing difficulties in obtaining supplies of raw jute and long-stapled cotton. On the other hand there is serious shortage of consumers' goods, especially of cotton textiles, sugar, coal, iron and steel in Pakistan. Recently an agreement

has been reached between the Governments of Pakistan and India on the question of the supply of the former's cotton to the latter against cloth. Under this agreement, the Government of India has undertaken to supply Pakistan 12 bales of cloth for every 20 bales of cotton. During the course of the year the Indian mills may receive approximately 4,00,000 bales as against their estimated requirements of 9,40,000 bales of Pakistan cotton. On the basis of the ratio of exchange agreed to, Pakistan will receive, if she exports 4,00,000 bales of cotton, 2,40,000 bales of cloth, as against 6,00,000 bales of cloth which her territories used to receive during the years when cloth control was in force. In this way both the countries will get about 40 per cent of their normal requirements. The deal clearly demonstrates the difficulties created by partition.¹⁸

India is trying to meet the situation by improving her agricultural production. In order to achieve self-sufficiency in food, the pumping and irrigation schemes are being given top priority all over the country; the manufacture of fertilisers is being speeded up and the 'Grow More Food' campaign is being conducted with all possible vigour. The cultivation of jute and cotton fibres is also being encouraged. The Indian Central Cotton Committee has sanctioned a number of schemes for the development of long-stapled and other improved varieties of cotton in the presidency of Madras. It is hoped that nearly 4 lakh bales of cotton of the staple length between 1 $\frac{1}{8}$ " and 1 $\frac{1}{4}$ " may be produced annually in the central districts of Madras. There is also a likelihood of producing in the west coast districts nearly one lakh bales of the long-stapled cotton ranging in staple length from 1 $\frac{1}{4}$ " to 1 $\frac{3}{4}$ ".¹⁹ In this way India is trying to be independent of Pakistan with regard to the supplies of foodstuffs and industrial raw materials.

Pakistan is equally anxious to be independent of India in respect of the supplies of manufactured goods. The Government of Pakistan has set up its own Industrial Panels to make plans for the development of industries inside its own territories and is trying its best to encourage indigenous as well as foreign industrialists to establish various industries. But in spite of the participation of foreign capital, a substantial proportion of the imports of capital goods will have to be paid for and exports

¹⁸ *Commerce*, March 20, 1948, p. 469.

¹⁹ *Commerce*, April 17, 1948, p. 646.

of agricultural produce and raw materials will have to be encouraged to provide the necessary foreign exchange. In brief, India has to make itself self-sufficient in food and raw materials, and Pakistan has to import all its capital and consumers' goods by its exports of food and raw materials. Thus on account of the partition of the country a disproportionate emphasis has to be placed on agricultural development both in India as well as in Pakistan. Under these circumstances the plans of industrial development prepared before August 15, 1947, will have to be altered considerably.

The indigenous resources of the country in capital and technical skill are inadequate to meet the requirements of post-war industrial development and hence both the Governments of India and Pakistan have declared their policies in this respect. The Hon'ble Dr Syama Prasad Mookerjee, Minister of Industry and Supply, while announcing the industrial policy of the Government of India, stated that 'the Government of India agree with the view of the Industries Conference that, while it should be recognized that participation of foreign capital and enterprise, particularly as regards industrial technique and knowledge, will be of value to the rapid industrialization of the country, it is necessary that the conditions under which they may participate in Indian industry should be carefully regulated in the national interest.

'Suitable legislation will be introduced for this purpose, and such legislation will provide for the scrutiny and approval by the Central Government of every individual case of participation of foreign capital and management in industry. It will provide that, as a rule, the major interest in ownership and effective control should always be in Indian hands, but power will be taken to deal with exceptional cases in a manner calculated to serve the national interest. In all cases, however, the training of suitable Indian personnel for the purpose of eventually replacing foreign experts will be insisted upon.'

The Government of Pakistan, in its anxiety to attract foreign capital has offered far easier terms in comparison to those of the Union Government. Mr Ismail Chundrigar, Commerce and Industries Minister, addressing a Press Conference 'welcomed participation of foreign capital to the extent of 49 per cent in 13 industries like cotton textiles, cement, coal, generation of electric power, minerals, heavy chemicals, ship-building, alcohol, sugar,

tanning, fish canning and fish oils. In some other industries like the manufacture of machine tools, automobiles, and tobacco, Mr Chundrigar disclosed that foreign capital could participate to the extent of 70 per cent. While ensuring participation of Pakistan capital, talent and labour in all these industries, the Government would in certain circumstances even permit a more overwhelming percentage to foreign capital if local capital was not forthcoming. The industries financed and controlled by nationals of other countries are assured of fair and just treatment. The Government will also provide facilities for the remittance of a reasonable proportion of profits to countries from which capital is drawn.'

While Pakistan is trying to woo foreign capital through her embassies in America and England the lines of co-operation between indigenous and foreign capital are emerging out clearly in the case of the Indian Union. The National Machinery Manufacturers Ltd., Bombay, with a capital of Rs. 5,00,00,000 is to be established with the assistance of British capital and technical skill. Full technical advice and assistance in the setting up and running of the company is to be provided by British firms; 74 per cent of the capital is to be subscribed by the textile mills in India and 26 per cent by Textile Machinery Makers Ltd., and Tweedales and Smalley (1920) Ltd. The Machinery Manufacturers' Corporation Ltd., Calcutta, having a capital of Rs. 1,50,00,000 is being started with the assistance of Messrs. H. & B. American Machine Co., Pawtucket, Rhode Island, and Messrs. Draper Corporation of Hopedale, Massachusetts (U.S.A.). John Inglis & Co. of Toronto (Canada) are to act as consulting engineers of this concern. Viscose Rayon Factory of Perumbavoor (near Alwaye, Travancore) is to be assisted by British firms in the matter of plant and equipment and technical advice will be obtained from Swiss experts. Three motor car manufacturing works, with a combined capacity of 20,000 vehicles per annum—two at Bombay and one at Calcutta—are under construction. The Premier Automobiles and the Motors House Gujarat, Bombay, are being assisted by the Chrysler Corporation of the U. S. A. and the Kaiser-Frazer Corporation of America respectively. The Hindustan Motors Ltd. of Calcutta is being started with the co-operation of the Nuffield Organization of the U. K. and the Studebaker Company of America.

The trends show clearly that the industrialists of India are getting the necessary assistance from the manufacturers of Britain and America in the matter of capital and technical skill. At the present time these are the only two countries which are in a position to participate in the industrial development of less advanced countries. But there are indications that in course of time India will get the co-operation of Japan and Australia also.

It is well known that India possesses mostly consumers' goods industries. The ship-building yards at Vizagapatam, the aircraft factories in Mysore and Baroda, the locomotive workshops at Jamshedpur, the automobile and machinery manufacturing works at Bombay and Calcutta and the rayon factory in Travancore represent only the nuclei of the numerous basic industries, so essential for building up a sound industrial structure. The Government of India have decided to own and operate or to direct the important basic industries in future. The Hon'ble Dr Syama Prasad Mookerjee, Industry and Supply Minister, announcing the Industrial Policy of the Government of India in the Dominion Parliament, on April 6, 1948, stated: '.... Government have decided that the manufacture of arms and ammunition, the production and control of atomic energy and the ownership and management of railway transport should be the exclusive monopoly of the Central Government. Further, in any emergency, Government would always have the power to take over any industry vital for national defence. In the case of the following industries, the State—which, in this context, includes Central, Provincial and State Governments and other public authorities like municipal corporations—will be exclusively responsible for the establishment of new undertakings, except where, in the national interest, the State itself finds it necessary to secure the co-operation of private enterprise, subject to such control and regulation as the Central Government may prescribe: (1) Coal, (2) Iron and Steel, (3) Aircraft Manufacture, (4) Ship-building, (5) Manufacture of Telephone, Telegraph and Wireless apparatus, excluding Radio Receiving Sets, and (6) Mineral Oils....

'There are certain basic industries of importance, apart from those mentioned above, the planning and regulation of which by the Central Government is necessary in the national interest. The following industries, whose location must lie governed by economic factors of all-India import, or which require a

considerable investment or a high degree of technical skill, will be the subject of Central regulation and control: salt, automobiles and tractors, prime movers, electric engineering, other heavy machinery, machine tools, heavy chemicals, fertilisers, pharmaceuticals and drugs, electro-chemical industries, non-ferrous metals, rubber manufactures, power and industrial alcohol, cotton and woollen textiles, cement, sugar, paper and newsprint, air and sea transport, minerals and industries related to defence....

'The Central Government have already embarked on enterprises like large river valley developments, which are multi-purpose projects of great magnitude, involving extensive generation of hydro-electric power and irrigation on a vast scale, and are calculated in a comparatively short time to change the entire face of large areas in this country. Projects like the Damodar Valley Scheme, the Kosi Reservoir, the Hirakud Dam, etc. are in a class by themselves and can stand comparison with any of the major schemes in America or elsewhere. The Central Government have also undertaken the production of fertilisers on a very large scale, and have in view other enterprises like the manufacture of essential drugs, and of synthetic oil from coal.' The Government is also participating in private enterprises. The Air India International Ltd. has been formed with an authorized capital of 7 crores. The Company has been floated to operate initially a service between India and the United Kingdom with a halt at Cairo and possibly at other places. The venture constitutes an innovation inasmuch as the Company is a partnership between the Government and a private firm. The Government of India holds 49 per cent of the Company's shares and has the right to call for the allotment of an additional 2 per cent so as to have 51 per cent share in the total capital of the Company. Two or three new corporations are also going to be formed to operate coastal and foreign shipping services of India. The Government is likely to take 51 per cent shares of these corporations.

The participation of the State in the establishment of new industrial enterprises is very important from the point of view of location and distribution of industries. First, some of the multi-purpose river valley schemes like the Mahanadi Valley Project and Rihand Dam are taking shape in industrially backward regions. They are likely to bring into existence numerous flourishing industrial centres in these regions. Secondly in

locating the State-owned industrial units the Government, unlike private entrepreneurs, will take into consideration social costs and strategic factors besides ordinary money-costs, and the location of industrial units based on these considerations may result in the creation of numerous industrial centres in hitherto undeveloped areas. The location of State-owned units in new centres may be followed up by the development of better transport relations, availability of skilled labour and repair shops and the establishment of financial and mercantile agencies. Generally new industrial units are attracted to the big industrial centres on account of the presence of the industrial and mercantile agencies and services there, which enable these units to achieve various external economies. And when the establishment of such agencies and services in new centres offers facilities of gaining similar external economies, besides obtaining cheaper land and labour, the forces responsible for the decentralization and dispersal of industries are immensely strengthened. Thus the location of State-owned units can very profitably be used to extend the industrial activity to numerous undeveloped regions possessing vast industrial potentialities.

Besides developing State-owned industries the Government has also taken power to regulate and control numerous other industries of all-India importance. The Government intends to achieve this end by granting or refusing licences for the establishment of new units. It is, perhaps, not fully realized that such conscious control of industrial location implies much more than the mere negative power to withhold licences. The licensing authority must possess more relevant information and knowledge than the private entrepreneur about the industrial potentialities of different regions so as to be in a position to tender advice about alternative locations, besides the one the application for which is being rejected. Such knowledge can only be acquired by arranging thorough surveys of the industrial resources and potentialities of different regions.²⁰ In addition to the collection of data and information about resources definite principles of licensing for the guidance of licensing authority should be clearly worked out. It cannot be simply assumed that a public authority will necessarily do better than private entrepreneurs; in the absence of definite principles for its

²⁰ See p. 251.

guidance such authority may probably do worse. State control for its own sake is likely to lead to more problems than it solves. It must be designed to secure external economies, avoid (hidden) social costs, and secure (hidden) social benefits—and of course to improve efficiency by definite economic, social and technical means.²¹ The Government of India propose to establish a National Planning Commission to formulate programmes of development and to secure their execution. Let us hope that all the problems connected with industrial planning and development will be taken up and solved satisfactorily by the proposed Commission.

21 Dr Vera Anstey: (Extract from a private letter to the author)

APPENDIX

INDUSTRIAL POLICY OF THE GOVERNMENT OF INDIA

Announced by Hon'ble Dr Syama Prasad Mookerjee, Minister of Industry and Supply, in the Dominion Parliament on April 6, 1948.

The Government of India have given careful thought to the economic problems facing the country. The nation has now set itself to establish a social order where justice and equality of opportunity shall be secured to all people. The immediate objective is to provide educational facilities and health services on a much wider scale, and to promote a rapid rise in the standard of living of the people by exploiting the latent resources of the country, increasing production and offering opportunities to all for employment in the service of the community. For this purpose, careful planning and integrated effort over the whole field of national activity are necessary and the Government of India propose to establish a National Planning Commission to formulate programmes of development and to secure their execution. The present statement, however, confines itself to Government's policy in the industrial field.

Any improvement in the economic conditions of the country postulates an increase in national wealth: a mere redistribution of existing wealth would make no essential difference to the people and would merely mean the distribution of poverty. A dynamic national policy must, therefore, be directed to a continuous increase in production by all possible means, side by side with measures to secure its equitable distribution. In the present state of the nation's economy, when the mass of the people are below the subsistence level, the emphasis should be on the expansion of production, both agricultural and industrial; and in particular on the production of capital equipment, of goods satisfying the basic needs of the people, and of commodities the export of which will increase earnings of foreign exchange.

The problem of State participation in industry and the conditions in which private enterprise should be allowed to operate

must be judged in this context. There can be no doubt that the State must play a progressively active role in the development of industries, but ability to achieve the main objectives should determine the immediate extent of State responsibility and the limits to private enterprise. Under present conditions, the mechanism and the resources of the State may not permit it to function forthwith in industry as widely as may be desirable. The Government of India are taking steps to remedy the situation, in particular, they are considering steps to create a body of men trained in business methods and management. They feel, however, that, for some time to come, the State could contribute more quickly to the increase of national wealth by expanding its present activities wherever it is already operating and by concentrating on new units of production in other fields, rather than on acquiring and running existing units. Meanwhile, private enterprise, properly directed and regulated, has a valuable role to play.

On these considerations the Government have decided that the manufacture of arms and ammunition, the production and control of atomic energy, and the ownership and management of railway transport should be the exclusive monopoly of the Central Government. Further, in any emergency, the Government would always have the power to take over any industry vital for national defence. In the case of the following industries, the State—which, in this context, includes Central, Provincial and State Governments and other public authorities like municipal corporations—will be exclusively responsible for the establishment of new undertakings, except where, in the national interest, the State itself finds it necessary to secure the co-operation of private enterprise subject to such control and regulation as the Central Government may prescribe:

- (1) Coal (the Indian Coal-fields Committee's proposals will be generally followed), (2) Iron and Steel, (3) Aircraft Manufacture, (4) Ship-building, (5) Manufacture of Telephone, Telegraph and Wireless apparatus, including Radio Receiving Sets, and (6) Mineral Oils.

While the inherent right of the State to acquire any existing industrial undertaking will always remain, and will be exercised whenever public interest requires it, Government have decided to let existing undertakings in these fields develop for a period of ten years, during which they will be allowed all facilities for

efficient working and reasonable expansion. At the end of this period, the whole matter will be reviewed and a decision taken in the light of circumstances obtaining at the time. If it is decided that the State should acquire any unit, the fundamental rights guaranteed by the Constitution will be observed and compensation will be awarded on a fair and equitable basis.

Management of State enterprise will, as a rule, be through the medium of public corporations under the statutory control of the Central Government, who will assume such powers as may be necessary to ensure this.

The Government of India have recently promulgated a measure for the control by the State of the generation and distribution of electric power. This industry will continue to be regulated in terms of this measure.

The rest of the industrial field will normally be open to private enterprise, individual as well as co-operative. The State will also progressively participate in this field; nor will it hesitate to intervene whenever the progress of an industry under private enterprise is unsatisfactory. The Central Government have already embarked on enterprises like large river valley developments, which are multi-purpose projects of great magnitude, involving extensive generation of hydro-electric power and irrigation on a vast scale, and are calculated in a comparatively short time to change the entire face of large areas in this country. Projects like the Damodar Valley Scheme, the Kosi Reservoir, the Hirakud Dam, etc. are in a class by themselves and can stand comparison with any of the major schemes in America or elsewhere. The Central Government have also undertaken the production of fertilizers on a very large scale and have in view other enterprises like the manufacture of essential drugs, and of synthetic oil from coal. Many Provincial and State Governments are also proceeding on similar lines.

There are certain basic industries of importance, apart from those mentioned earlier, the planning and regulation of which by the Central Government is necessary in the national interest. The following industries whose location must be governed by economic factors of all-India import, or which require considerable investment or a high degree of technical skill, will be the subject of Central regulation and control:—

¹⁷⁸Salt, automobiles and tractors, prime movers, electric engineering, other heavy machinery, machine tools, heavy chemicals,

fertilizers, pharmaceuticals and drugs, electro-chemical industries, non-ferrous metals, rubber manufactures, power and industrial alcohol, cotton and woollen textiles, cement, sugar, paper and newsprint, air and sea transport, minerals and industries related to defence.

The above list cannot obviously be of an exhaustive nature. The Government of India, while retaining the ultimate direction over this field of industry, will consult the Governments of the Provinces and States at all stages and fully associate them in the formulation and execution of plans. Besides these Governments, representatives of industry and labour will also be associated with the Central Government in the Industrial Advisory Council and other bodies which they propose to establish, as recommended by the Industries Conference.

Cottage and small-scale industries have a very important role in national economy, offering as they do scope for individual, village or co-operative enterprise, and means for the rehabilitation of displaced persons. These industries are particularly suited for the better utilization of local resources and for the achievement of local self-sufficiency in respect of certain types of essential consumers' goods like food, cloth and agricultural implements. The healthy expansion of cottage and small-scale industries depends upon a number of factors like the provision of raw materials, cheap power, technical advice, organized marketing of their produce, and, where necessary, safeguards against intensive competition by large-scale manufacture, as well as on the education of the worker in the use of the best available technique. Most of these fall in the provincial sphere and are receiving the attention of the Governments of the Provinces and the States.

- The resolution of the Industries Conference has requested the Central Government to investigate how far and in what manner these industries can be co-ordinated and integrated with large-scale industries. The Government accept this recommendation. It will be examined, for example, how the textile mill industry can be made complementary to rather than competitive with the handloom industry, which is the country's largest and best organized cottage industry.

In certain other lines of production, like agricultural implements, textile accessories, and parts of machine tools, it ~~will~~ be possible to produce components on a cottage-industry scale

and assemble these at a factory. It will also be investigated how far industries at present highly centralized could be decentralized with advantage.

The resolution of the Industries Conference has recommended that Government should establish a Cottage Industries Board for the fostering of small-scale industries. The Government accept this recommendation and propose to create suitable machinery to implement it. A Cottage and Small-scale Industries Directorate will also be set up within the Directorate General of Industry and Supply.

One of the main objectives will be to give a distinctly co-operative bias to this field of industry. During and before the last war, even a predominantly agricultural country like China showed what could be done in this respect, and her mobile industrial co-operative units were of outstanding assistance in her struggle against Japan. The present international situation is likely to lessen to a marked degree our chances of getting capital goods for large-scale industry, and the leeway must be made up by having recourse to small-size industrial co-operatives throughout the country.

The Government, however, recognize that their objective, viz. securing the maximum increase in production, will not be realized merely by prescribing the respective spheres of the State and of private enterprise in industry; it is equally essential to ensure the fullest co-operation between labour and management and the maintenance of stable and friendly relations between them. A resolution on this subject was unanimously passed by the Industries Conference which was held in December last. Amongst other things, the resolution states:

'The system of remuneration to capital as well as labour must be so devised that, while in the interests of the consumers and the primary producers, excessive profits should be prevented by suitable methods of taxation and otherwise, both will share the product of their common effort, after making provision for payment of fair wages to labour, a fair return on capital employed in the industry and reasonable reserves for the maintenance and expansion of the undertaking.'

Government accept this resolution. They also consider that labour's share of the profits should be on a sliding scale normally varying with production. They propose, in addition to

the over-all regulation of industry by the State, to establish machinery for advising on fair wages, fair remuneration for capital, and conditions of labour. They will also take steps to associate labour in all matters concerning industrial production.

The machinery which Government propose to set up will function at different levels, Central, regional and unit. At the Centre, there will be a Central Advisory Council, which will cover the entire field of industry, and will have under it committees for each major industry. These committees may be split up into sub-committees dealing with specific questions relating to the industry, e.g. production, industrial relations, wage fixation, and distribution of profits.

The regional machinery under the provincial Governments will be Provincial Advisory Boards which, like the Central Advisory Council, will cover the entire field of industry within the province; they will have under them provincial committees for each major industry. The provincial committees may also be split up into various sub-committees dealing with specific questions relating to production, wage fixation and industrial relations. Below the provincial committees will come the works committees and the production committees attached to each major industrial establishment.

The works committees will be bi-partite in character, consisting of representatives of employers and workers only, in equal numbers. All other committees will be tri-partite, with representatives of Government, employers and workers.

Government hope that the machinery proposed will substantially reduce the volume of industrial disputes. In the case of unresolved conflicts, Government trust that management and labour will, in their own interests and in the larger interests of the country, agree to settle them through recognized channels of conciliation and arbitration which will be provided by Government. The industrial relations machinery, both at the Centre and in the provinces, is being strengthened, and permanent industrial tribunals are being established for dealing with major disputes.

The Government are also taking special steps to improve industrial housing as quickly as possible. A scheme for the construction of one million workers' houses in ten years is under contemplation, and a Housing Board is being constituted for this purpose. The cost will be shared in suitable proportions

between Government, employers and labour, the share of labour being recovered in the form of a reasonable rent.

In order to ensure quick decisions on various matters arising out of the industrial truce resolution, Government are appointing a special officer.

The Government of India agree with the view of the Industries Conference that, while it should be recognized that participation of foreign capital and enterprise, particularly as regards industrial technique and knowledge, will be of value to the rapid industrialization of the country, it is necessary that the conditions under which they may participate in Indian industry should be carefully regulated in the national interest. Suitable legislation will be introduced for this purpose.

Such legislation will provide for the scrutiny and approval by the Central Government of every individual case of participation of foreign capital and management in industry. It will provide that, as a rule, the major interest in ownership and effective control should always be in Indian hands; but power will be taken to deal with exceptional cases in a manner calculated to serve the national interest. In all cases, however, the training of suitable Indian personnel for the purpose of eventually replacing foreign experts will be insisted upon.

The Government are fully alive to their direct responsibility for the development of those industries which they have found necessary to reserve exclusively for State enterprise. They are equally ready to extend their assistance to private or co-operative enterprise in the rest of the industrial field and in particular by removing transport difficulties and by facilitating the import of essential raw materials to the maximum possible extent.

The tariff policy of Government will be designed to prevent unfair foreign competition and to promote the utilization of India's resources without imposing unjustifiable burdens on the consumer. The system of taxation will be reviewed and readjusted where necessary to encourage saving and productive investment and to prevent undue concentration of wealth in a small section of the population.

The Government hope that this elucidation of their intentions on fundamental aspects of industrial policy will remove all apprehensions, and they are confident that a joint and intensive effort will now be made by labour, capital and the general public, which will pave the way for the rapid industrialization of the country.

BIBLIOGRAPHY

I. Reports

1. Report of the Indian Industrial Commission, (1916-18)
2. Report of the Indian Fiscal Commission, (1921-22)
3. Minutes of Evidence Recorded by the Indian Fiscal Commission, (1923)
4. Report of the Indian Tariff Board, (Cotton Textile Industry Enquiry) (1927)
5. Report of the Special Tariff Board on the Enquiry regarding the level of duties necessary to afford adequate protection to Indian Cotton Textile Industry, (1936)
6. Report of the Indian Tariff Board on Woollen Textile Industry, (1935)
7. Report of the Bengal Jute Enquiry Committee, (1934)
8. Report of the Bengal Jute Enquiry Committee, (1940)
9. Report on the Marketing and Transport of Jute in India, (1940)
10. Report on the Marketing of Jute and Jute Products: Second Report, (1941)
11. Report of the Indian Tariff Board regarding the grant of protection to the Steel Industry, (1924)
12. Report of the Indian Tariff Board regarding the grant of supplementary protection to the Steel Industry, (1925)
13. Report of the Indian Tariff Board, Statutory Enquiry, (1926)—Steel Industry
14. Report of the Chemical Industries Committee, Bihar, (1939)
15. Report of the Indian Coal Committee, (1925)
16. Report of the Coal Mining Committee, (1937)
17. Report of the Indian Sugar Committee, (1920)
18. Report of the Indian Tariff Board on the Sugar Industry, (1931)
19. Proceedings of the Sugar Conference, (1933)
20. Report of the Indian Tariff Board on the Sugar Industry, (1938)
21. Report of the Sugar Enquiry Sub-committee on Sugar Industry in Bengal, (1942)
22. Report on the Marketing of Sugar in India and Burma, (1941)
23. Report on the Marketing of Hides in India and Burma, (1943)

24. Report on the Marketing of Skins in India and Burma, (1943)
25. Report of the Committee on the Working of Indian Railways, (1920-21)
26. Report of the Indian Railway Enquiry Committee, (1937)
27. Report on the Supply of Labour in the United Provinces and Bengal, (1906)
28. Report of Investigations into Conditions of Indian Textile Workers, (The Right Hon. T. Shaw, M. P.,) (May, 1927)
29. Report of the Royal Commission on Labour in India, (1931)
30. Royal Commission on Labour in India, Evidence
31. Report of the Textile Labour Enquiry Committee, (1937-38), (Interim Report, Bombay)
32. Report of the Textile Labour Enquiry Committee of the Central Province and Berar, (1938)
33. Report of the Cawnpore Labour Enquiry Committee, (1938)
34. Report of the Bihar Labour Enquiry Committee, (1940)
35. Report of the Hydro-Electric Survey of India, (1919-21)
36. Report of the Industries Re-organization Committee, U.P., (1934)
37. Report on Economic Planning in the U. P., (1937)
38. First Report on the Progress of Reconstruction Planning, Government of India, Reconstruction Committee of Council, (March, 1944)
39. Second Report on Reconstruction Planning (Reconstruction Committee of Council, 1944)
40. Report of the Famine Enquiry Commission, (Final Report, 1945)
41. Report on the Location of Industry in Great Britain, (P.E.P., 1939)
42. Report of the Royal Commission on the Distribution of the Industrial Population of Great Britain, (1940)
43. Report of the Committee on Land Utilization in Rural Areas, (Britain, 1942)
44. Final Report of the Committee on Compensation and Betterment, (Britain, 1942)
45. Report of the Fact Finding Committee (Handloom and Textiles, India, 1942)
46. Report of the Indian Coal-fields' Committee, (1946)
47. Reports of the Industrial Panels, (Post-war), (India)
48. ~~Five-year Plans of the Central and Provincial Governments of India, (Post-war)~~

49. Reports of the National Planning Committee, (India)
50. Report of the Advisory Planning Board, (India, 1947)

II. Pamphlets, Monographs, Memoranda, Handbooks, etc.

1. Monograph on Woollen Fabrics in N.W. Provinces and Oudh, (A. W. Pim)
2. Note on Wool in India, (A. H. Silverman, and J. K. Mehta, 1919)
3. Handbook on the Quality of Indian Wool, (1942)
4. India's Coal Resources, (Sir L. L. Fermour, Director, Geological Survey of India, 1935)
5. The Construction of Locomotives in India in State Railway Workshops, (J. Humphries and Kalyan C. Srinivasam, 1940)
6. Sugar Manuals, (The Sugar Technologists' Association of India, Cawnpore, 1940, 1941, 1942)
7. Indian Tanstuffs and their Tannage, (1918)
8. Tanstuffs of the Sundar Ban Forest Division, (Pilgrim, J. A., 1920)
9. Practical Investigations of Some Indian Tanstuffs, (Department of Industries, Bengal, 1924)
10. Wattle Bark, (K. Seshachalam Choudary, 1927)
11. Divi Divi, (K. Seshachalam Choudary, 1928)
12. South Indian Myrobalans, (K. Seshachalam Choudary and E. Yoganandam Nayudu, 1929)
13. Bark of Hopea Parviflora as a Tanning Material, (The Staff of the Leather Trades Institute, Madras, 1929)
14. Note on the Cultivation of Green Wattle, *Acacia Decurrens*, (M. S. Raghavan, 1939)
15. A Monograph on Indian Railway Rates, (S. C. Ghosh, 1918)
16. Planning for Post-War Electric Power, (V. R. Vaidya, 1943)
17. Village Industrialization, (Sir M. Visvesvaraya, 1945)
18. Handbook of Commercial Information for India, (C. W. E. Cotton, 1937)
19. U. P. Commercial Directory, (1941-42)
20. Finance and Structure of Industry, (R. Balkrishna, 1943)
21. Industrialization, (P. S. Loka Nath, 1943)
22. A Plan for Economic Development of India (J. R. D. Tata and Others, 1944)
23. Post-War Industrial Development, (Engineering Association of India, 1944)
24. Tariffs and Industry, (John Matthai, 1944)

25. Post-War Forest Policy for India, (Sir Herbert Howard, 1944)
26. A Study in the Industrial Development of Bengal, (M. L. Khemka, 1944)
27. The Location of Industry in India, (Office of the Economic Adviser to the Government of India, 1944)
28. Reconstruction in Post-War India, (Sir M. Visvesvaraya, Second Impression, 1945)
29. Statement of Government's Industrial Policy (Planning and Development Department, April 1945)
30. Industrial Location, (Bimal C. Ghose, 1945)

III. Statistical and Other Government Publications

1. Census Reports
2. The Large Industrial Establishments in India, (Biennial)
3. Records of the Geological Survey of India
4. Crop Atlas of India
5. Administration Reports of the Provinces and the States
6. Annual Statement of Sea-borne Trade of British India with the British Empire and Foreign Countries, Vols. I and II
7. Statistical Abstract for British India
8. Agricultural Statistics of India, Vols. I and II
9. Monthly Statistics of Spinning and Weaving in Indian Mills
10. Bihar District Gazetteers, Santhal Paraganas, (Second Edition, 1938)

IV. Journals and Magazines

1. Eastern Economist
2. Commerce
3. Pacific Affairs
4. Foreign Affairs
5. Indian Finance
6. Indian Textile Journal
7. Indian Sugar
8. Indian Farming
9. Indian Labour Gazette
10. Indian Information
11. Indian Journal of Economics.

V. Books

Adames, J. T. & Vannest, C. G. —*The Record of America* (1942)
Adarkar, B. P. —*Indian Fiscal Policy* (1941)

Andrew, W. P.

Anstey, Vera

Balkrishna, R.

Birdwood, G. C. M.

Buchanan, Francis

Chauduri, Rohinimohan

Dey, H. L.

Dutt, R. C.

Gadgil D. R.

Gandhi, M. P.

Harris, F. R.

Hubbard, G. E.

Jones, Lt. Rodwell & Bryan,
P. W.

Knowles, L. C. A.

... —*Indian Railways* (Fourth Edition, 1884)

... —*Economic Development of India* (Third Edition, 1939)

... —*Regional Planning in India* (1948)

... —*Industrial Art of India* (1880)

... —*A Journey from Madras through the Countries of Mysore, Canara, and Malabar* (1807)

... —*The Evolution of Indian Industry* (1939)

... —(1) *Collected Papers*
(2) *The Indian Tariff Problem* (1933)

... —*The Economic History of India under Early British Rule* (Fourth Edition)

... —*Industrial Evolution of India in Recent Times* (Fourth Edition, reprinted, 1944)

... —(1) *Indian Cotton Textile Industry—Its Past, Present and Future* (1930)
(2) *Indian Sugar Industry—Its Past, Present and Future* (1934)

... —*Jamsetji Nusserwanji Tata: A Chronicle of His Life* (1925)

... —*Eastern Industrialization and Its Effects on the West* (1938)

... —*North America* (Fifth Edition, 1938)

—*Economic Development of British Overseas Empire* (Second Edition, 1928)

Lokanathan, P. S. — *Industrial Organization in India* (1935)

Morison, S. E. & Commager H. S. — *The Growth of American Republic* (1942)

Mukerjee, R. K. ... — (1) *The Changing Face of Bengal*
 (2) *Man and His Habitation* (1940)
 (3) *Social Ecology*
 (4) *Economic History of India, 1600 to 1800*
 (5) *The Indian Working Class* (1945)

Mukerjee, R. K. & Dey, H. L. ... — *Economic Problems of Modern India* (Vols. 2)

Mumford, Lewis ... — (1) *The Culture of Cities* (1938)
 (2) *City Development*, (1946)

Ohlin, P. ... — *Inter-Regional and International Trade*, (Second Printing, 1935)

Panandikar, S. G. ... — *Industrial Labour in India* (1933)

Parkes, Henry Bamford ... — *Recent America* (1943)

Pearse, A. S. ... — *Cotton Industry of India* (1930)

Pillai, P. P. ... — *Economic Conditions in India* (Second Impression 1928)

Ramanujam, T. V. ... — *The Functions of State Railways in Indian National Economy* (1942)

Rutnagur, S. M. ... — *The Bombay Industries: The Cotton Mills* (1927)

Samant, D. R. & Mulky, M.A. ... — *Organization and Finance of Industries in India* (1937)

Sanyal, N. ... — *Development of Indian Railways* (1930)

Sastry, N. S. R. ... — *A Statistical Study of India's Industrial Development* (1947)

Sen, K. N. ... — *Economic Reconstruction of India* (1939)

Smith, J. Russel ... — *Industrial and Commercial Geography* (New Edition)

Smith, J. Russel & Phillips, M.O. ... — *North America* (1942 Edn.)

Soni, H. R. ... — *Indian Industry and Its Problems*, Vol. I (1932)

Stephenson, Flora & Pool, Phoebe — *Target for Tomorrow, No. II* (1944)

Tavernier, J. B. ... — *Travels in India*, Vols. 2 (Second Edition, 1925)

Tiwari, R. D. ... — *Railway Rates in relation to Trade and Industry in India* (1937)

Troup, R. S. ... — *Silviculture of Indian Trees*, Vol. 3 (1921)

Vakil, C. N., Bose & Deolalkar ... — *Growth of Trade and Industries in Modern India* (1931)

Vakil, C. N. & Munshi, M. C. ... — *Industrial Policy of India* (1934)

Visvesvaraya, Sir M. ... — *Planned Economy for India* (1934)

Vyed, Teijiro ... — *Small Industries of Japan: Their Growth and Development* (1938)

Wales, Nym ... — *China Builds for Democracy* (1942)

Wallace, D. R. ... — *Romance of Jute* (1928)

Weber, A. ... — *Theory of Location of Industries*, (English Edition, 1929)

Wilson, H. H ... — *Travels in the Himalayan Provinces of Hindustan and the Punjab* (1837)

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